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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

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NASA SP-7011 (06)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Information System during Dec., 1964

Scientific and Technical Information Division
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. JANUARY 1965

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INTRODUCTION

SP-7011 (06) is the seventh issue of *Aerospace Medicine and Biology*, NASA's continuing bibliography for the abstracting and announcement of current references on this subject. The publication is compiled through the cooperative efforts of the Aerospace Medicine and Biology Bibliography Project (AMBBP) of the Library of Congress (LC), the American Institute of Aeronautics and Astronautics, and National Aeronautics and Space Administration. It assembles, within the covers of a single bibliographic announcement, groups of references that were formerly announced in separate journals and provides a convenient compilation for medical and biological scientists. Additional background details for this publication can be found in the first issue, SP-7011.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis will be placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion. The contents of this issue are comprised of abstracts that were prepared by the three contributing organizations.

Each entry in SP-7011 (06) consists of a standard citation accompanied by its abstract. It is included in one of three groups of references that appear in the following order:

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(continued)

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a continuing bibliography JANUARY 1965

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A. A. Ovchinnikov and V. S. Puginskiy *In its* Tech. Cybernetics, No. 3, 1964 10 Sep. 1964 p 109–119 ref (See N64-30207 22-01) OTS: $6.00

Some methods are considered for the rational planning of the training process based on the use of logical diagram; possibilities are discovered for the use of logical diagrams for improvement of organization of the learning process. Author

N64-30234 Joint Publications Research Service, Washington, D.C.
VESTNIK OF USSR ACADEMY OF MEDICAL SCIENCES
20 May 1964 168 p Transl. into ENGLISH from Vestnik Akad. Med. Nauk SSSR (Moscow), v 19, no. 2, 1964 p 3–109 (JPRS-24682; OTS-64-31293) OTS: $3.00

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N64-30235 Joint Publications Research Service, Washington, D.C.
THE APPLICATION OF RADIO TELEMETERING TO SPACE MEDICINE
T. T. Akulinichev and R. M. Bayevskiy *In its* Vestnik of USSR Acad. of Med. Sci. 20 May 1964 p 90–97 (See N64-30234 22-16) OTS: $3.00

A general discussion of the need for obtaining biomedical information from spaceships and satellites is presented. Various equipment for obtaining this information is described, and in particular, a brief description is given of the physiological metering system used in the spaceships Vostok III and Vostok IV. Six channels of a spaceship's telemetering system were used to study the following: (1) the electrical activity of the brain in a fronto-occipital lead; (2) the electrical activity of the eyes and oculomotor muscles; (3) the electrical activity of the heart in a bipolar chest lead; (4) respiratory changes in the chest parameter; (5) skin galvanic reaction in the area of the foot; and (6) the heart rate. Also discussed is the possible application of space biotelemetering to ground conditions (e.g., operating rooms). P.V.E.

N64-30236 Joint Publications Research Service, Washington, D.C.

THE APPLICATION OF RADIO TELEMETERING TO STUDIES ON WORK AND SPORT PHYSIOLOGY

V. V. Rozenblat *In its* Vestnik of USSR Acad. of Med. Sci., 20 May 1964 p 98-104 (See N64-30234 22-16) OTS: $3.00

Methods of radio recording a number of indices of the activity of cardiovascular, respiratory, and neuromuscular systems are outlined. Radio telemetering observations, in sport and work physiology, made along three main lines—radiopulsometry, study of respiration, and radio electrocardiography are discussed. Studies were made of athletes in different specialties and of various occupational groups. Typical changes in the cardiac rhythmn during different exercises and operations have been established. The results of the observations presented confirm the fact that the heart rate is a valuable index that, in an integral manner, reflects the degree of physiological strain brought about by the intensity of physical exertion, nervous emotional factors, and conditions under which the work is performed. P.V.E.

N64-30237 Joint Publications Research Service, Washington, D.C.

RADIO TELEMETERING STUDY OF THE DIGESTIVE FUNCTIONS

A. S. Belousov, I. I. Malkiman, and A. M. Sorin *In its* Vestnik of USSR Acad. of Med. Sci., 20 May 1964 p 105-114 (See N64-30234 22-16) OTS: $3.00

Radio capsules for recording the pH, the pressure, and the temperature of the gastrointestinal tract are described. Some experiments and their results are discussed. It was found that the use of radio capsules causes no disorders in the digestive functions; that the capsules are well tolerated by sick and by healthy persons; and that they make it possible to conduct long-lasting and continuous observations of the functions of the digestive tract. It is concluded that the method of radiotelemetering investigations of the digestive tract is very promising. P.V.E.

N64-30238 Joint Publications Research Service, Washington, D.C.

DIAGNOSTIC APPLICATION OF ULTRASOUND

M. D. Gurevich and D. I. Tsurupa *In its* Vestnik of USSR Acad. of Med. Sci., 20 May 1964 p 115-119 (See N64-30234 22-16) OTS: $3.00

The present possibilities of echography are based on an analysis of the shape, size, and location of the macroscopic structure of the pathological focus in the surrounding tissues and of the degree to which the ultrasound is reflected. Diagnostic echography apparatus make possible the diagnosis of a number of diseases of different tissues and organs. It is concluded that application of echography to clinical diagnosis shows undoubted promise. P.V.E.

N64-30239 Joint Publications Research Service, Washington, D.C.

THE LATEST IN METHODS OF INVESTIGATION OF THE CARDIOVASCULAR SYSTEM

V. L. Karpman *In its* Vestnik of USSR Acad. of Med. Sci., 20 May 1964 p 120-125 (See N64-30234 22-16) OTS: $3.00

The application of computer technology to the study of the cardiovascular system is discussed. Also discussed are new apparatus used in measuring various parameters and components of the cardiovascular system. Included in the discussion are tachosciliography, dynamocardiography, ultrasonic cardiography, electrokymography, cardiocyclography, phonocardiography, and sphygmographs. P.V.E.

N64-30240 Joint Publications Research Service, Washington, D.C.

NEW METHODS OF NEUROPHYSIOLOGICAL INVESTIGATION

P. G. Kostyuk *In its* Vestnik of USSR Acad. of Med. Sci., 20 May 1964 p 126-155 (See N64-30234 22-16) OTS: $3.00

Methods of analyzing the nervous and muscular activities on the cellular level are discussed, with particular emphasis being placed on methods using intracellular microelectrodes. P.V.E.

N64-30241 Joint Publications Research Service, Washington, D.C.

TRANSLATIONS FROM JOURNAL MEDITSINSKAYA RADIOLOGIYA (MEDICAL RADIOLOGY), VOL. IX, NO. 5, 1964

1 Sep. 1964 60 p refs Transl. into ENGLISH of 6 articles from Med. Radiol. (Moscow), v. 9, no. 5, 1964 (JPRS-26216; TT-64-41475) OTS: $3.00

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N64-30242 Joint Publications Research Service, Washington, D.C.

INFLUENCE OF MEXAMINE ON THE COURSE OF GENERAL REACTION OF THE ORGANISM OF PATIENTS SUBJECTED TO RADIATION THERAPY

A. N. Gamaleya, M. D. Donskoy, and A. V. Surikov *In its* Transl. from J. Med. Radiol., V. 9, No. 5, 1964 p 1-8 refs (See N64-30241 22-16) OTS: $3.00

Mexamine in peroral use in doses of 0.05 g 20 to 30 minutes prior to telegamma therapy completely eradicates general reaction for more than half the patients and alleviates its manifestation for another one-third of the patients. Radioprotective properties of mexamine are more manifest in clinical cases where reaction to irradiation is poorly marked (5 from 6 patients), and is less effective in average reaction. Mexamine does not appreciably influence local tissue reactions. In spite of side actions (revealed for one-fifth of the patients), mexamine is a valuable means of combatting general reaction of organisms in radiation therapy. Author

N64-30243 Joint Publications Research Service, Washington, D.C.

CHANGES IN FRACTIONAL COMPOSITION AND COLLOIDAL STABILITY OF SERUM PROTEINS IN RABBIT BLOOD IN RADIATION SICKNESS

Yu. M. Madiyevskiy *In its* Transl. from J. Med. Radiol., V. 9, No. 5, 1964 p 9–17 refs (See N64-30241 22-16) OTS: $3.00

Irradiation with 200 r is accompanied by a reduction in β-globulins (2nd to 20th days) and an increase in γ-globulins (7th to 20th day); the content of albumin and α-globulins remains constant. The thermal coagulation time of the blood serum lengthens (up to 25%) from the 1st through the 4th and on the 10th day after irradiation. Irradiation with 800 r is accompanied by hypoalbuminemia (1st to 30th days), hyper-α- and β-globulia (1st to 10th days) and hyper-gamma-globulia (starting from 30th day). The lengthening of the thermal coagulation time (up to 58%) is observed from the 1st through the 30th day after irradiation. Author

N64-30244 Joint Publications Research Service, Washington, D.C.

REACTION OF SPLEEN, LYMPH NODES AND LOOSE CONNECTING TISSUE TO ANTIGENIC STIMULI IN IRRADIATED ANIMALS

V. V. Shikhodyrov and N. N. Klemparskaya *In its* Transl. from J. Med. Radiol., V. 9, No. 5, 1964 p 18–28 refs (See N64-30241 22-11) OTS: $3.00

When heated vaccine from paratyphoid Breslau bacillus is introduced, there is a change of spleen, lymph nodes, and loose connecting tissue. After 5 to 10 days, there is an increase of divisible cells in spleen and lymph nodes. In loose connecting tissue, there is an increased quantity of young fibroblasts and macrophages. Monotypic changes occur in spleen and lymph nodes of white mice irradiated in doses of 500 r; dystrophic changes occur in the loose connecting tissue. There are fewer morphologic changes in animals irradiated 20 days after immunization. A.W.

N64-30245 Joint Publications Research Service, Washington, D.C.

EFFECT OF UNITHIOL UPON COURSE OF ACUTE URANIUM INTOXICATION

A. T. Ivannikov *In its* Transl. from J. Med. Radiol., V. 9, No. 5, 1964 p 29–37 refs (See N64-30241 22-16) OTS: $3.00

Unithiol is not effective in accelerating the excretion of uranium from an organism. Its injection increases the accumulation of uranium in skeleton and retards its excretion with urine. Application of unithiol in a case of uranyl nitrate poisoning causes more acute uranium intoxication and is accompanied by more diffuse lesion of kidney ducts. However, earlier application of unithiol during poisoning by uranyl nitrate in small doses (5 mg/kg) lowers mortality of white rats by 30%, as compared to control. This is apparently the result of the normalizing effect of unithiol on metabolistic processes. Author

N64-30246 Joint Publications Research Service, Washington, D.C.

REMOTE IMMUNOLOGIC CONSEQUENCES OF EFFECT OF IONIZING RADIATION

P. N. Kiselev and P. A. Buzini *In its* Transl. from J. Med. Radiol., V. 9, No. 5, 1964 p 38–50 refs (See N64-30241 22-16) OTS: $3.00

The more sensitive an organism is to radiation and the greater the damage it sustains, the longer the organism retains the negative immunologic consequences of the radiation sickness it suffered. Experiments also indicated faster restoration of immunity for white mice as compared to guinea pigs, which are more sensitive to radiation. Disturbance in immunity cannot be classed, in principle, as irreparable damage. However, natural immunity is recovered very slowly. A.W.

N64-30247 Joint Publications Research Service, Washington, D.C.

RADIOSENSITIVITY OF MICE AFTER SPLENECTOMY AND APPLICATION OF HOMOGENATE OF SPLEEN TISSUE IN CHRONIC RADIATION SICKNESS

K. L. Kovalevskiy *In its* Transl. from J. Med. Radiol., V. 9, No. 5 1964 p 51–57 refs (See N64-30241 22-16) OTS: $3.00

It was shown that after a splenectomy mice develop leucocytosis. The number of leucocytes is first reduced and then restored to the initial figures for animals in the experimental group (removed spleen) at a later stage than for the control. Autopsies disclosed a hemorrhagic syndrome in mice subjected to splenectomy, whereas for control mice (with spleen) hyperemia and swollen internal organs were observed. There is more serious radiation sickness and higher mortality for mice subjected to splenectomy than for animals with preserved spleens, irradiated by the same doses of X-rays. In splenectomized mice, after injections of homogenate of homologic spleen tissue during the first few hours after X-ray, irradiation mortality is reduced. Homogenate of spleen prevents the occurrence of multiple hemorrhages in internal organs when injected into organisms of irradiated mice. Author

N64-30321 Joint Publications Research Service, Washington, D.C.

TRANSLATIONS FROM VOPROSY PSIKHOLOGII (PROBLEMS OF PSYCHOLOGY), NO. 3, 1963

20 Aug. 1964 72 p refs Transl. into ENGLISH of selected articles from Vopr. Psikhologii (Moscow), no. 3, 1963 (JPRS-26014; TT-64-41284) OTS: $3.00

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N64-30322 Joint Publications Research Service, Washington, D.C.

APPARATUS FOR RECORDING MOTOR AND SENSORY ACTS OF THE OPERATOR IN AUTOMATIC AND SEMI-AUTOMATIC CONTROL SYSTEMS

Ye. S. Zav'yalov, A. P. Kuz'minov, and V. I. Mankevich *In its* Transl. from Vopr. Psikhologii (Probl. of Psychol.), No. 3, 1963 p 1-6 (See N64-30321 22-14) OTS: $3.00

An apparatus for recording the activity of an operator working at a control system is described. The apparatus works automatically and performs the following operations: It starts up an electrostopwatch with the end of a command phrase by an experimenter, and stops it with the beginning of a spoken answer to a given command, or after the operator fulfills an answering motor action. Using a pulse camera that works synchronously with control impulses of a signal exciter, it records on picture frames the time reading of the electrostopwatch, the readings of the indicators, the position of the signaling apparatus and of control levers on the test panel in the initial and final state. Using a tape recorder, it records the content of any spoken assignments to the operator, as well as his answers. P.V.E.

N64-30323 Joint Publications Research Service, Washington, D.C.

EXPERIMENTAL METHODS: AN EXPERIMENTAL APPARATUS FOR STUDYING THE INFLUENCE OF VARIOUS VISUAL SIGNALLING PARAMETERS ON THE EFFECTIVENESS OF MOTOR REACTIONS

V. N. Antonov, V. V. Lepeshkin, and A. Ye. Ol'shannikova *In its* Transl. from Vopr. Psikhologii (Probl. of Psychol.), No. 3, 1963 p 7-11 (See N64-30321 22-14) OTS: $3.00

An apparatus is described that is intended for the following purposes: (1) a study of the dependency of time of motor reactions upon the intensity of visual stimulants under different conditions, comparable with industrial ones, and (2) a study of the relationship between time characteristics of motor reactions (magnitude of time of reaction, its duration, etc.) and their other quantitative characteristics (degree of intensity of pressure on push button, form of curve of pressure, etc.). P.V.E.

N64-30324 Joint Publications Research Service, Washington, D.C.

DISCUSSIONS AND CONSIDERATIONS: IS AN "ALGORITHMIC" APPROACH TO THE ANALYSIS OF LEARNING PROCESSES VALID?

N. G. Alekseyev *In its* Transl. from Vopr. Psikhologii (Probl. of Psychol.), No. 3, 1963 p 12-24 refs (See N64-30321 22-14) OTS: $3.00

The assumption that learning algorithms leads not only to mastering the solution of certain definite problems but also to mastering general methods of thinking is critically analyzed. Questions considered include the basic positions of the concept of algorithms, the implementation of algorithms in the practice of learning, and the relationship of algorithms to the theory of mastering thinking activity. P.V.E.

N64-30325 Joint Publications Research Service, Washington, D.C.

CORTICAL CONTROL OF EYE MOVEMENTS (ROLE OF PRE-MOTOR SECTIONS OF THE BRAIN IN CONTROL OF EYE MOVEMENTS)

Ye. D. Khomskaya *In its* Transl. from Vopr. Psikhologii (Probl. of Psychol.), No. 3, 1963 p 46-59 refs (See N64-30321 22-14) OTS: $3.00

Twelve patients with lesions of premotor sections of the brain were examined. The focus of the lesion was in the left premotor zone of 10 patients, and in 2 patients it was in the right zone. It was found that experimental data obtained from patients with lesions of premotor sections of the brain differ essentially from results of examinations of healthy individuals. Eye movements of a majority of the patients with lesion of the premotor area of the brain were characterized by de-automatization criteria: absence of standardness, of rhythmicality (in one series of tests), and of smoothness (in another series of tests). The data presented indicate that the front cortical eye-motor center has a preferential relation with those forms of eye-movement control that are carried out on the basis of the system of speech connections, and is, to a smaller degree, connected with forms of eye-movement control conditioned by visual afferent factors. P.V.E.

N64-30343* Harvard School of Public Health, Boston, Mass.

LIVING IN SPACE

Ross A. Mc Farland *In* NASA, Washington Proc. of the 4th Natl. Conf. on the Peaceful Uses of Space 1964 p 173-175 (See N64-30326 22-01) GPO: $1.50

Some of the implications of the space program for medicine and the biological sciences are examined. Included is work in such areas as the effects of the environment on health and performance, the description and measurement of "normal health," the operation of basic physiological mechanisms under stress, and the refinement of instrumentation for observing, recording, and analyzing physiological data. R.L.K.

N64-30344* National Aeronautics and Space Administration. Manned Spacecraft Center, Langley Station, Va.

THE MEDICAL SUPPORT OF MANNED SPACE FLIGHT

Charles A. Berry *In* NASA, Washington Proc. of the 4th Natl. Conf. on the Peaceful Uses of Space 1964 p 177-186 (See N64-30326 22-01) GPO: $1.50

The program is described in detail in the areas of crew selection and training, medical maintenance and preflight preparation, medical monitoring, and the evaluation of physiological responses to space flight. R.L.K.

N64-30345* Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.

SPACE-CABIN ATMOSPHERES

Emanuel M. Roth *In* NASA, Washington Proc. of the 4th Natl. Conf. on the Peaceful Uses of Space. 1964 p 187-193 (See N64-30326 22-01) GPO: $1.50

In selecting a space-cabin atmosphere, a complex interaction between human physiology, the gaseous environment, the machine, and the mission must be considered. Outlined are the major reasons for uncertainty and the problems of optimizing the man-machine system in this respect. The physical variables include total pressure, oxygen pressure, carbon dioxide pressure, inert-gas pressure, water-vapor pressure, gaseous trace contaminants, thermal properties of gas, circulation and temperature of gas, leakage rate of gas, duration of exposure, and gravitation level. The physiological, physical, and pathological variables on which these environmental variables may act include alertness and performance, decompression syndromes, radiation sensitivity, fire and blast hazards, bacterial flora changes and infections, water physiology, respiratory physiology, oxygen-toxicity syndrome, and thermal control problems. Project Mercury successfully used 100% oxygen at 5 psi for simplicity of control engineering and minimization of weight, but Cooper's 34-hour flight was apparently just under the wire for oxygen toxicity. R.L.K.

N64-30391 Joint Publications Research Service, Washington, D.C.
RECENT DEVELOPMENTS IN MEDICAL INSTRUMENTS
27 Jul. 1964 52 p refs Transl. into ENGLISH of a booklet "Pribory i Apparatura Olya Biologicheskikh Issledovaniy i Meditsinskoy Diagnostiki" Moscow, State Sci. Res. Inst. of Sci. and Tech. Inform., 1962 p 1-28
(JPRS-25587; TT-64-31859) OTS: $2.00

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N64-30392 Joint Publications Research Service, Washington, D.C.
THE CLINICAL ELECTRO-CARDIO-STIMULATOR EKSK-1
A. L. Baranovskiy, G. Z. Ganelin, and L. T. Danilevich *In its* Recent Develop. in Med. Instr. 27 Jul. 1964 p 1-12 (See N64-30391 22-16) OTS: $2.00

The operation and circuitry of a clinical electrocardiostimulator is discussed. The stimulator is a low-frequency generator of current pulses with three variable parameters: recurrence frequency, duration, and amplitude. The pulse recurrence frequency is limited between 30 and 200 pulses per minute, and can be changed in a continuous manner. The pulse duration has limits of 1 to 10 milliseconds, and the duration control is discrete through 1 millisecond. The amplitude of the pulse current is within the limits of 0 to 150 milliamperes, and has three subbands—0 to 15 ma, 0 to 75 ma, and 0 to 150 ma. The amplitude control within the limits of a subband is discrete with 11 steps. P.V.E.

N64-30393 Joint Publications Research Service, Washington, D.C.
AN ELECTRONIC INSTRUMENT FOR DETERMINING THE SPEED OF PULSE WAVE PROPAGATION
A. I. Gefter, S. S. Belousov, T. M. Tarantovich, and V. A. Mel'nikova *In its* Recent Develop. in Med. Instr. 27 Jul. 1964 p 13-17 (See N64-30391 22-16) OTS: $2.00

An instrument for measuring the propagation speed of pulse waves in arteries is described. The instrument is an electric mechanism consisting of two amplifying channels, gating circuits that control polarized relays, a triggering mechanism, an electronic timer, and a power unit. The operating principle of the instrument consists of separately amplified signals taken from transducers fixed at two various points of the arterial system that control the electronic timer, permitting the determination of the time difference between two pulses. P.V.E.

N64-30394 Joint Publications Research Service, Washington, D.C.
INSTRUMENT FOR STUDYING THE VOCAL CORDS
N. E. Rabinovich *In its* Recent Develop. in Med. Instr. 27 Jul. 1964 p 18-25 (See N64-30391 22-16) OTS: $2.00

An electronic laryngostroboscope, developed to observe and study the vocal cords, is described. A system of feedback is utilized to provide synchronization between the light flashes and the oscillations of the vocal cords. A laryngophone, fastened on the neck of the patient at the clavicular notch, where the sounds caused by the working of the vocal cords are easily heard, picks up the oscillations of the vocal cords and delivers electrical signals from the whole spectrum of sound frequencies to the input of the control unit. Sinusoidal oscillations picked out of the spectrum and corresponding to the basic frequency of the oscillations of the cords are transformed into impulses that are relayed to the illumination unit consisting of an ignition system and a gas-discharge tube. The light flashes are directed, with the help of frontal and laryngeal mirrors, into the larynx of the patient. P.V.E.

N64-30395 Joint Publications Research Service, Washington, D.C.
A METHOD OF MEASURING DIFFUSION AND CAPILLARY-OSMOTIC PROCESSES
B. V. Deryagin, M. M. Milekhina, and V. I. Andreyev *In its* Recent Develop. in Med. Instr. 27 Jul. 1964 p 26-30 refs (See N64-30391 22-16) OTS: $2.00

A method of determining the kinetics of diffusion and capillary-osmotic processes, using radioactive isotopes, is presented. Also presented are the results of some measurements obtained using the method. P.V.E.

N64-30396 Joint Publications Research Service, Washington, D.C.
AN APPARATUS FOR SYNCHRONIZED TREATMENT OF BIOLOGICAL OBJECTS WITH MODULATED MICROWAVES "SINKHROIMPUL'S"
A. R. Livenson and V. A. Gavrilin *In its* Recent Develop. in Med. Instr. 27 Jul. 1964 p 31-46 refs (See N64-30391 22-16) OTS: $2.00

A system developed for synchronized treatment of a biological object by pulse (modulated) microwaves is described. The system of blood circulation, particularly the pulse wave or the heart's electrical activity, is used as the rhythmic function. In the apparatus used, a magnetron generator operating on a frequency of 2.375 mc/sec acts, with the help of a directed radiator, on the living organism. A transducer picks up the pulse wave—the wave of an electrocardiogram—and an electronic shaping mechanism produces signals controlling the modulator. P.V.E.

N64-30465 California U., Los Angeles Brain Research Inst.
STUDIES OF BRAIN FUNCTION AND BEHAVIOR Final Report, May 1, 1961-Apr. 30, 1963
J. D. French, W. R. Adey, and H. W. Magoun 25 May 1964 10 p refs
(Grant AF-AFOSR-61-81)
(AFOSR-64-1195; AD-442844)

The studies of brain function and behavior are summarized under the following headings: (1) the EEG correlation with behavioral processes; (2) studies of basic sleep mechanisms; (3) the EEG and behavioral studies of monkeys raised in darkness; (4) studies of urinary steroid excretion in monkeys exposed to simulated orbital flight; (5) exposure of monkeys to acceleration and vibration stresses; (6) development of a chimpanzee stereotaxic brain atlas; (7) development of an EEG recording system for use in aerospace flight; and (8) computer techniques in analysis of EEG data. P.V.E.

N64-30466 Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SUBJECTIVE COMPARISON OF SONIC BOOMS WITH OTHER AIRCRAFT NOISE Technical Memorandum, 1 Dec. 1963–1 Mar. 1964
[1964] 2 p

Results are reported of tests for determining the startle effects produced in human beings by unexpected sonic booms in a control group and a noncontrol group, both of which experienced soothing music throughout the testing. Other tests are described in which subjects tried to distinguish between an octave band of pure noise and the same noise plus a pure tone at the center frequency. Conditions and experimental details are reported, and planned future work is described. D.E.W.

N64-30491 Tufts U., Medford, Mass.
THE ROLE OF THE PINNA IN HUMAN LOCALIZATION
Dwight W. Batteau Jan. 1964 31 p refs
(Contract N123(60530)-32279A)
(AD-600151) OTS: $2.60

In theory, the role of the pinna in localization is to introduce, by means of delay paths, a transformation of the incoming signal, which is mentally inverted to provide attention; the inverse transform required defines the location of the sound source. Relatively simple systems of delays, attenuations, and signed additions may be used to construct the inverse transformations; these could easily be realized in the nervous system. It may be further theorized that the same method of constructing inverse transformations can apply to monaural and binaural localization, sound recognition, and the utilization of reverberation. Author

N64-30493 Naval School of Aviation Medicine, Pensacola, Fla. Naval Aviation Medical Center
SIGNIFICANT PHYSIOLOGICAL PARAMETERS OF THE BALLISTOCARDIOGRAM AS ANALYZED BY A MATHEMATICAL MODEL
Robert L. Morse 8 Jan. 1964 22 p refs
(Rept.-11; AD-439502)

Investigation by means of a mathematical model and digital computer demonstrates that specific abnormalities of the human acceleration ballistocardiogram may be due to corresponding variations in arterial pulse wave shape and arterial elasticity. Author

N64-30498 School of Aerospace Medicine, Brooks AFB, Tex.
HEMATOLOGIC CHANGES FOLLOWING SIMPLE EXODONTIA
Ira L. Shannon, Edward E. Davis, and William A. Gibson Nov. 1963 11 p refs
(SAM-TR-63-82; AD 439666) OTS: $1.10

Hematologic studies were carried out on 90 systemically healthy, young adult males, some of whom underwent a simple exodontic experience. In one experiment, blood samples were collected before and at 2- and 4-day intervals after tooth removal. In another, blood was drawn prior to and at 4 hours after exodontia. In the 4-hour study, significant changes following extraction were noted for white blood cells, neutrophils, lymphocytes, hematocrit, and corrected sedimentation rate. Only the latter factor was found to change significantly in the 4-day study. These results are related to previously established adrenocortical hyperactivity in patients undergoing comparable dental procedures. Author

N64-30499 Cincinnati U., Ohio
A COMPARISON OF MODES OF PRESENTATION OF PAIRED-ASSOCIATES ON THE SUBJECT-MATTER TRAINER
Alfred B. Kristofferson, John A. Modrick, and Ross L. Morgan Wright-Patterson AFB, Ohio, AMRL, Jun. 1963 19 p refs
(Contract AF 33(616)-7674)
(AD-439648) OTS: $1.60

An experiment was conducted to evaluate the effectiveness of each of four modes of the Subject-Matter trainer. The modes were these: (1) the Quiz Mode, in which the subject was shown sequentially the correct response following the presentation of each stimulus; (2) the Modified-Quiz Mode, in which the subject was allowed one free choice before being shown the correct response; (3) the Practice Mode, in which the subject responded freely until he found the correct response; and (4) the Single-Try Mode, in which the subject was allowed only one response to each stimulus. Four groups of 24 subjects each were used. Each group learned under a different mode of the Subject-Matter trainer. Each subject learned 20 paired adjectives to a criterion of two successive, completely correct trials. Retention was measured after 1 day and after 7 days. The Quiz Mode was superior to the other modes, all of which involved active participation and some degree of feedback. Retention after 1 day was almost perfect for all groups. The amount retained after 7 days did not differ significantly among the groups. Author

N64-30500 Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio
BIBLIOGRAPHY ON MAINTENANCE PERSONNEL PERFORMANCE MEASUREMENT
William B. Askren, Jr. Jun. 1963 23 p refs
(AMRL-Memo-P-45; AD-439610) OTS: $2.60

N64-30504* Little (Arthur D.) Inc., Cambridge, Mass.
ON CREDIBLE CATASTROPHIC ENVENTUALITIES IN SELECTED AREAS OF GOVERNMENT-SPONSORED ACTIVITIES
Sep. 1963 127 p refs Prepared for Columbia U.
(Contract NASr-181)
(NASA-CR-58145) OTS: $4.00 fs, $1.00 mf

Using the criterion of $20 million damage as the threshold of catastrophic devastation, eventualities are selected that are credible since they result from a combination of incidents, each of which has occurred in the past on separate occasions. One hazard considered is the transportation of missile propellants and their incompatibility with industrial compounds that are shipped in much larger quantities. Shipping regulations are directed to the properties of the chemicals per se, with reduced attention given to incompatibility with other chemicals. A second credible hazard of lower probability, because of the limited number of firings, is from the failure of a large chemical rocket during launch. Hazards peculiar to military aircraft during an increased alert status, or under automatic direction from the ground, are evaluated. Nuclear propulsion danger is difficult to specify because designs for candidate motors are still under investigation, but the most serious credible accident does not appear to be in the catastrophic range. The most hazardous of weather control attempts - hurricane control - might produce calamitous damage during experimental work. R.L.K.

N64-30536* Gaustad Mental Hospital, Oslo (Norway) EEG Lab.
COLLECTION OF BIOLOGICAL INFORMATION DURING PROLONGED FLIGHT MISSIONS WITH "YES AND NO" DATA REDUCTION ANALYSIS
C. W. Sem-Jacobsen, E. Kaiser, and I. E. Sem-Jacobsen Repr. from Aerospace Med., v. 35, Sep. 1964 p 880-883 refs
(Contract NAS2-1235)

Biomedical and technical data collected during simulated and actual flight missions may be recorded on multichannel magnetic tape or paper. This can be accomplished by a "yes" and "no" system. The prime data are fed to detector bridges, which give positive and negative output tension according to the input signals and criteria set. The information is coded on punch tape and is grouped in frames that contain 100 characters, which are punched at the rate of 50 characters per second. A master code consists of several "yes" and "no" answers and is set according to experience and present criteria. Data on the frames are reduced drastically, but permit immediate vital information through processing by a computer. I.v.L.

N64-30538 Hammersmith Hospital, London (Gt. Brit.)
FACTORS MODIFYING THE ACTION OF NEUROMUSCULAR BLOCKING AGENTS Third Quarterly Technical Status Report, 1 Oct.–31 Dec. 1963
J. P. Payne [1963] 4 p
(Contract DA-91-591-EUC-2881)
(AD-439674)

Experiments with compound 1420 were performed on rat-diaphragm preparation to demonstrate any action of the drug at the motor end plate. It was found that small doses of the compound (3 to 4 mg) would produce a partial block when the muscle was stimulated indirectly, but that direct stimulation was not affected. When 1420 was given after tubocurarine, gallamine, and decamethonium, its blocking effect was found to be more enhanced with decamethonium than with the competitive blocking agents. Compound G.34075 was tested on rat-diaphragm preparation to establish its effect on the muscle twitch elicited by direct and indirect stimulation. The twitch response was blocked with both types of stimulation, but the onset of 100% block was slower when the muscle was stimulated directly. Diallyl-nor-toxiferin produced neuromuscular block at a dose level similar to that of tubocurarine; direct muscle stimulation was unaffected. The effect of pH on the action of the drug was studied, and it was observed that its action was enhanced as the pH was raised to a maximum of 9. P.V.E.

N64-30569 Mississippi State U., State Coll.
PHYSICAL, CHEMICAL AND MICROBIOLOGICAL EVALUATION OF ELECTROCHEMICAL DEGRADATION OF HUMAN WASTES Informal Progress Report No. 7, 1 Jan.–31 Mar. 1964
[1964] 22 p refs
(Contract AF 41(609)-1633)
(AD-605724)

Studies on the growth rate of *Chlorella 71105* in various types of EDO were conducted to determine whether a deficiency or toxicity exists in the EDO. It was determined that a superior rate of growth was obtained when the EDO was filtered. The optimum period of electrolysis when the DO was diluted prior to electrolysis was 72 hours. Macroelements used to make Knop's medium did not increase the growth of *Chlorella 71105* when added to the EDO independently. A slight increase in growth rate was observed when the microelements were added to the EDO as a group. The dilution of the EDO at the rate of 1:20 and 1:100 did not enhance the growth of the test alga. Electrolysis of the undiluted DO and subsequent dilution to 1:5 produced the greatest increase in growth of *Chlorella 71105* recorded to date. Nitrite nitrogen, phosphates, and sulfates were determined. Author

N64-30570 London U. (Gt. Brit.) Queen Mary Coll.
CARBOXYLATION MECHANISMS IN PHOTOSYNTHESIS Annual Summary Report, 1 Oct. 1962–30 Sep. 1963
Margaret Birmingham and C. P. Whittingham Oct. 1963 18 p refs
(Contract AF-EOAR-62-24)
(ASR-3; AD-429263)

The following experiments are discussed: (1) feeding experiments with glucose-U-C^{14}—the effect of CO_2 concentration on the photometabolism of glucose-U-C^{14} in *Chlorella* (in the presence of INH); (2) feeding experiments with specifically labeled glucose—investigations using glucose specifically labeled in the one-, two-, or six-carbon atoms; (3) feeding specifically labeled glucose at CO_2 free air; (4) effect of oxygen on photometabolism of glucose; (5) degradation of glycollate produced during the photometabolism of radioactive glucose; and (6) feeding experiments with serine-3-C^{14}. P.V.E.

N64-30602 Argonne National Lab., Ill.
THE DETERMINATION OF INORGANICALLY BOUND IODINE-131 IN URINE
William D. Fairman Jun. 1964 25 p refs
(Contract W-31-109-ENG-38)
(ANL-6887) OTS: $0.50

Inorganically bound iodine-131 is separated from other urinary constituents by ion exchange on a silver chloride column. After removal as iodic acid from the column by acidified chlorine water, the iodine is subjected to two oxidation-reduction solvent-extraction cycles and finally precipitated as silver iodide. The mounted precipitate is beta and/or gamma counted. Chemical and radiochemical yields are 87.2 $\pm$1.5%. Total time for the procedure (exclusive of counting time) is approximately 2 hr for a single sample. Tracer interference experiments show that silver, chloride, bromide, and mercury exchange onto the silver chloride, but these elements are removed in the elution and extraction steps. The other elements studied—cadmium, cerium, antimony, ruthenium, tellurium, molybdenum, and technetium—do not exchange onto the silver chloride. Author

N64-30613 Joint Publications Research Service, Washington, D.C.
STUDIES ON IONIZING RADIATION
V. N. Strel'tsova and Y. I. Moskalev 24 Sep. 1964 106 p Transl. into ENGLISH of parts of the book "Blastomogennoye Deystviye Ioniziruyushchey Radiatsii" Moscow, Meditsina Publishing House, 1964
(JPRS-26532; TT-64-41790) OTS: $4.00

Portions of chapters from the book "Blastogenic Effect of Ionizing Radiation" are presented. These are the chapters: (1) "Development of Leukoses under the Influence of Ionizing Radiation;" (2) "General Mechanisms of Tumorgenesis Induced by Ionizing Radiation;" and (3) "Some Questions Relating to the Pathogenesis of Radiation-Induced Tumors." Highlights of Chapter (1) are as follows. All leukoses are caused by different kinds of radiation and radioactive isotopes, each possessing a different type of distribution. Total irradiation possesses greater leukoses activity than local irradiation. Uniformly distributed isotopes, possessing mixed low-power beta-gamma radiation (Ce^{135}, Nb^{95}) induce the appearance of leukoses relatively more frequently than do isotopes that are selectively

deposited in bone tissue and the liver. Chapter (2) shows that the capacity of ionizing radiation, including radioactive isotopes, to induce tumors depends not only upon the localization of the irradiation but also upon the "reactivity" of the irradiated tissue, which is determined by the presence and intensity of mitotic cycles, regeneration capacity, radiosensitivity, etc. Chapter (3) states that neoplasmas of radiation etiology may be considered as somatic mutations. The mechanisms involved in the appearances of these mutations may vary. They may be caused by chromosome injury, by injury to the enzyme systems of the oxidative cycle, etc. I.v.L.

N64-30623 Brookhaven National Lab., Upton, N.Y.
THE IMPACT OF ISOTOPIC TRACERS ON PHYSIOLOGICAL CONCEPTS
James S. Robertson 12 Feb. 1964 17 p refs *Its* Lecture Series No. 33
(BNL-857(T-341)) OTS: $0.50

This lecture gives a historical background, in order to describe the state of thinking at the time of the discovery of radioisotopes, and discusses the qualitative aspects of some basic discoveries made possible by and through the use of radioisotopes. In addition, an analytical interpretation of the kinetic behavior of tracers—the quantitative aspects of the tracer theory—is presented. I.v.L.

N64-30646 Army Personnel Research Office, Washington, D.C.
INFORMATION ASSIMILATION FROM ALPHA-NUMERIC DISPLAYS—AMOUNT AND DENSITY OF INFORMATION PRESENTED Technical Research Note 141
Seymour Ringel and Charles Hammer Apr. 1964 27 p refs
(AD-601973) OTS: $0.75

Thirty subjects were required to extract specific items of information from slide-projected displays of varying amounts and densities. Results were as follows: (1) As total amount of information presented increased from 10 to 25 lines, mean search time increased approximately 4 sec (an increase of approximately 24%). (2) Pertinent information near the bottom of the displays took approximately 4 sec longer to find than information near the top (a difference of approximately 22%). (3) When the number of columns to be searched was increased from two to four, search time increased 6 sec per added column (a total time increase of 100%). (4) Search time for high density of information was slightly shorter than for medium and low densities. (5) Accuracy was high under all conditions of search. Author

N64-30696 Naval Medical Research Inst., Bethesda, Md.
PRACTICAL SOLUTIONS TO PROBLEMS OF THIRST IN CLOSED OR OPEN SPACES
Julius Sendroy, Jr. 27 Jan. 1964 12 p refs Presented in Part at the 1st Intern. Symp. on Thirst in the Regulation of Body Water, Florida State U., Tallahassee, May 1963
(Rept.-3, AD-603261) OTS: $1.00

A review is given of work done on the problem of obtaining an adequate supply of water for drinking pruposes, under conditions of unusual stress such as may be experienced by survivors of shipwreck at sea, or by the passengers of a space vehicle. The experimental and practical development of a chemical briquet that converts sea water to a potable fluid is described, for the use of castaways at sea. Several chemical approaches, and an ultimate physical one involving the principle of freeze drying, are used to produce potable water from urine in a repetitious sequence of physiological and physicochemical cycling of this vital fluid. Author

N64-30703 Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EXAMINATIONS OF THE EFFECT OF LOW FREQUENCY MECHANICAL VIBRATIONS ON CHANGES IN THE BLOOD OF WHITE RATS
Ewa Otto-Buczkowska and Edmund Stoklosa 28 Jul. 1964 11 p refs Transl. into ENGLISH from Acta Physiol. Polonica (Poland), v. 14, no. 5, 1963 p 533-539
(FTD-TT-64-242/1; AD-446787)

Experiments were performed with 30 white rats of the Wistar breed. In the course of 2 hours the animals were submitted to the action of vibrations of frequency 5 Hz and amplitude 20 mm in a specially constructed apparatus. Examinations of the peripheral blood and bone marrow were carried out before and after the vibrations. In the animals submitted to the action of vibrations there were observed a pronounced decrease in the number of erythrocytes and an increase in the number of leucocytes with a predominance of neutrophilic granulocytes. In the bone marrow, stimulation of the myeloblastic system was noted. Author

N64-30712 School of Aerospace Medicine, Brooks AFB, Tex.
LECTURES IN AEROSPACE MEDICINE, 3-7 FEBRUARY 1964
[1964] 325 p refs
(AD-445253)

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22. BANQUET ADDRESS: [OBJECTIVES IN SPACE] J. Ferguson (AF Dept., Wash., D.C.) p 311-320 (See N64-30733 22-01)

N64-30713 School of Aerospace Medicine, Brooks AFB, Tex.
KEYNOTE ADDRESS: A YEAR OF PROGRESS
Theodore C. Bedwell, Jr. *In its* Lectures in Aerospace Med., 3-7 Feb. 1964 [1964] p 4-12 (See N64-30712 22-16)

In the conquest of space, the study of human responses to novel environments is invaluable. The Air Force and NASA have achieved notable success in their increasing cooperation in the fields of aerospace medicine and bioastronautics. The highlights of one year's progress are reviewed. A.W.

N64-30714* National Aeronautics and Space Administration, Washington, D.C.
NASA PROGRESS IN LIFE SCIENCES
Hugh L. Dryden *In* School of Aerospace Med. Lectures in Aerospace Med., 3-7 Feb., 1964 [1964] p 13-25 (See N64-30712 22-16)

The space-medicine program began with the flight of Alan B. Shepard, Jr., in the first of the Project Mercury series. Bioinstrumentation for this flight and for the second manned suborbital flight measured respiration only, but with actual orbital flight, more sophisticated measurements (such as those of blood pressure) came into being. Weightlessness as a hazard in space was also studied. Future flights, such as Gemini and Apollo, will test man's responses in space for periods of weeks. Basic research in the life sciences is divided into four headings—Behavioral Biology, Environmental Biology, Exobiology, and Physical Biology—each of which is discussed. A.W.

N64-30715 Naval School of Aviation Medicine, Pensacola, Fla.
NAVAL MEDICAL SUPPORT OF THE NATIONAL SPACE PROGRAMS
Langdon C. Newman *In* School of Aerospace Med. Lectures in Aerospace Med., 3-7 Feb. 1964 [1964] p 26-35 (See N64-30712 22-16)

Some of the aspects discussed of Naval medical support of the space programs are the pioneering pre-Mercury flights of rhesus and squirrel monkeys; the centrifuge development; the Navy Mark IV pressure suits; recovery at sea; and medical research in weightlessness, with particular emphasis on the vestibular organs. A.W.

N64-30716 Air Force Dept., Washington, D.C.
AIR FORCE MEDICAL SUPPORT OF THE NATIONAL SPACE PROGRAMS
Richard L. Bohannon *In* School of Aerospace Med. Lectures in Aerospace Med., 3-7 Feb. 1964 [1964] p 36-41 (See N64-30712 22-16)

The Air Force contributed the flight surgeon as a vital member of the support team for the man in space. Additionally, the Air Force conducts extensive research in solar flares, one of the greatest hazards to manned space flight. It is also studying the "level of arousal" in man during performances of his job in space. Through its simulators, the Air Force duplicates environmental conditions of space and tests human responses thereto. It has also assisted in screening and selecting astronauts. Perhaps its most important contribution will be the manned orbiting laboratory, which is now under development. A.W.

N64-30717 School of Aerospace Medicine, Brooks AFB, Tex.
NEW INFORMATION ON SOLAR FLARES AND SPACE RADIATION
Edwin R. Ballinger *In its* Lectures on Aerospace Med., 3-7 Feb. 1964 [1964] p 42-49 (See N64-30712 22-16)

There are three potential radiation hazards in space—galactic cosmic radiation, the Van Allen belts, and solar flares. Of these three, the most dangerous are the solar flares. Suggested protection against these flares includes prediction, shielding, maneuverability, onboard monitoring devices, and biological protection. These are explained and discussed. A.W.

N64-30718 School of Aerospace Medicine, Brooks AFB, Tex.
CREW STRUCTURE IN FUTURE SPACE MISSIONS
Bryce O. Hartman and Don E. Flinn *In its* Lectures in Aerospace Med., 3-7 Feb. 1964 [1964] p 50-72 refs (See N64-30712 22-16)

Experimentation during simulated flights as well as actual aircrew experience indicates that despite minor irritations, well-motivated crew members are capable of suppressing antagonistic feelings in the interest of mission completion, and continue to function without an adverse effect upon performance. Although interpersonal problems may occur in small crews as mission time is extended, it appears likely that any such problems will not be of major magnitude, and that there are no grounds for predicting that they will reduce crew effectiveness. As crews become larger, even brief missions may result in interpersonal problems. Clearly defined vocational roles and crew structure will become increasingly important as crews become larger. There will always be a "pilot" and it seems logical that he will be the leader of the crew. A review of anecdotal material regarding behavior during disasters and catastrophes reveals that here is a potential in groups for nonadaptive behavior. Author

N64-30719* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
ESTABLISHMENT OF ENVIRONMENTAL RISKS
John M. Eggleston *In* School of Aerospace Med. Lectures in Aerospace Med., 3-7 Feb. 1964 [1964] p 73-92 (See N64-30712 22-16)

Discussion is given of some of the environmental factors that will affect the Apollo mission. The most important of these are solar flares, meteoroids, lunar-surface ejecta, the lunar surface itself, photometric characteristics of the moon, and lunar temperatures. A.W.

N64-30720 School of Aerospace Medicine, Brooks AFB, Tex.
MILITARY ASPECTS OF SATELLITE-TO-EARTH VISIBILITY
William B. Clark, Floyd M. Morris, and James F. Culver *In its* Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 93–99 refs (See N64-30712 22-16)

An ordinary man only very rarely utilizes his maximal visual capability. He would therefore not be likely to see as much as an astronaut who, because of his prior flying experience and his training, has become accustomed to the utilization of his maximum visual capability. Thus, in spite of the belief that extravehicular vision would contribute little, the Mercury astronauts proved that the application of intelligent interpretation to the available clues can "resolve" fantastically small visual targets. They have proven that military reconnaissance is possible with unaided eyes. Author

N64-30721 Indiana U., Bloomington
SATELLITE-TO-SATELLITE VISIBILITY
Ingeborg Schmidt *In* School of Aerospace Med. Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 100–118 refs (See N64-30712 22-16)

With an increasing number of orbiting satellites and in view of future rendezvous maneuvers in space, the problem of the visibility of a space vehicle from another space vehicle deserves special attention. The main visual functions involved are discussed and an attempt is made, on the basis of laboratory findings, to predict the visibility of a satellite in typical situations. Most laboratory findings are obtained at fairly short distances. When applying these results to vision in space, the assumption is made that the same visual mechanisms mediate perception. For simplification, the analysis is confined to orbital flights around earth and does not include the phases of takeoff and reentry with their special visual problems. The terminal phase in a rendezvous is also not considered. It is assumed that one single satellite serves as the visual target. Author

N64-30722 School of Aerospace Medicine, Brooks AFB, Tex.
AEROMEDICAL EVALUATION OF SPACE PILOTS
Lawrence E. Lamb *In its* Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 119–142 (See N64-30712 22-16)

Aeromedical evaluations differ from those obtained from hospitals and clinics in that the former are based on the early detection of disease in the asymptomatic individual rather than, as in the latter, on data from the ill and ailing. In the development of space medicine, Navy diagnostic techniques and procedures have been originated or improved. Aeromedical evaluation consists of aeromedical history, physical examination, laboratory examination, radiology evaluation, otorhinolaryngology evaluation, ophthalmology evaluation, neurological evaluation, psychiatric and psychological evaluation, pulmonary evaluation, and cardiovascular evaluation. A.W.

N64-30725* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
DEVELOPMENT OF THE APOLLO PORTABLE LIFE SUPPORT SYSTEM
William C. Kincaide *In* School of Aerospace Med. Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 182–192 refs (See N64-30712 22-16)

The Apollo portable life-support system provides a habitable environment for the extravehicular explorer while he is exposed to the extreme environments of free space and the lunar surface. Basically, the assembly consists of an anthropomorphic pressure garment including helmet, gloves, boots, a back-mounted portable life-support system, which also contains the communication–telemetry package, an emergency oxygen system, and a thermal protective garment that will isolate the entire assembly from the external environmental extremes anticipated. The pressure garment, helmet, gloves, and boots also serve as backup to the cabin pressurization system. Author

N64-30727 School of Aerospace Medicine, Brooks AFB, Tex.
HAZARDS IN OXYGEN ENVIRONMENT
Hans-Georg Clamann *In its* Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 208–224 refs (See N64-30712 22-16)

The question is discussed as to whether the prolonged inhalation of oxygen of high percentage at normal or near-normal partial pressure, but at low total pressure, has adverse effects upon man. Experiments carried out in this connection show no adverse effects. A second experiment carried out at ambient pressure, high oxygen partial pressure, and high percentage (90%) resulted in definite signs of oxygen poisoning. A clear answer has not been found to the problem of exposing an astronaut to a given oxygen pressure for long periods of time. A.W.

N64-30729* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
SPACECRAFT ENVIRONMENTAL SYSTEMS DEVELOPMENT PROGRAMS
Frank H. Samonski, Jr. *In* School of Aerospace Med. Lectures in Aerospace Med., 3–7 Feb. 1964 [1964] p 234–238 (See N64-30712 22-16)

A comparison is made between the test philosophy and the development test programs conducted for the Project Mercury environmental control system and those planned for the Projects Gemini and Apollo environmental control systems. Author

N64-30742 Joint Publications Research Service, Washington, D.C.
METABOLISM DURING RADIATION INJURIES
N. F. Lipkan 22 Sep. 1964 82 p Transl. into ENGLISH of Pt. II from the book "Elementy Radiatsionnoy Biologii i Biokhimii" Kiev, 1963 p 45–136
(JPRS-26500; TT-64-41758) OTS: $3.00

The following are discussed: (1) Radiochemical Processes in the Tissues; (2) Protein and Nucleic Acid Metabolism; (3) Carbohydrate Metabolism; (4) Oxidation–Reduction Processes and Energy Metabolism; (5) Fat Metabolism; (6) Mineral and Water Metabolism; (7) Changes in the Biological Activity of Enzymes, Hormones, and Vitamins; (8) Radiation Injuries of Individual Systems, Organs, and Tissues; and (9) Normalization of Metabolism During Radiation Injuries. Author

N64-30754 Cornell U., New York, N.Y.
THE PREVENTION OF INFECTION IN ACCIDENTAL WOUNDS
Donald Kaye and Edward W. Hook [1963] 115 p refs
(Contract PH 86-62-170)

The literature concerning infection in wounds and in burns is reviewed, and specific recommendations are made for the prevention of pyogenic and clostridial infections. The emphasis is on management in mass-casualty situations resulting from acts of war. Sections are included on the pathogenesis and manisfestations of infection, on radiation and infection, and on the use of hyperbaric oxygen. R.L.K.

N64-30777 Joint Publications Research Service, Washington, D.C.
SOME CURRENT PROBLEMS IN CELL REGULATION
Bela Faludi, Tamas Frey, Endre Biro et al 25 Sep. 1964 138 p refs Transl. into ENGLISH of a series of lectures from Magy. Tudo Akad. Biol. Oszt. Kozlemen. (Budapest), v. VII, no. 1-2, 1964
(JPRS-26558; TT-64-41816) OTS: $4.00

CONTENTS:
1. SOME CURRENT PROBLEMS IN CELL REGULATION B. Faludi, T. Frey, and E. Biro p 1-27 refs
2. REGULATION OF MATERIAL UPTAKE IN PLANT CELLS Z. Boszormenyi p 28-60 refs
3. BIOLOGICAL TRANSPORT PHENOMENA AS FACTORS IN THE REGULATION OF METABOLISM G. Gardos p 61-78 refs
4. GROWTH CONTROL A. Garay p 79-100 refs
5. CONTROL OF CELL DIVISION AND GROWTH G. Rappay p 101-117 refs
6. GENETIC CONTROL OF ENZYME SYNTHESIS G. Denes p 118-135 refs

N64-30782 California U., Berkeley Lawrence Radiation Lab.
SUPPLEMENT TO BIOLOGY AND MEDICINE SEMIANNUAL REPORT, SPRING 1964
[1964] 56 p refs
(Contract W-7405-ENG-48)
(UCRL-11387, Suppl.) OTS: $1.25

CONTENTS:
1. ON THE SPATIAL DISTRIBUTION OF RADICALS PRODUCED BY IRRADIATION S. J. Wyard 7 p refs (See N64-30783 22-07)
2. EPR STUDIES ON OH RADICAL IDENTIFICATION IN IRRADIATED H_2O T. E. Gunter and C. D. Jeffries 6 p refs (See N64-30784 22-07)
3. ELECTRON MICROSCOPY OF SINGLE-STRANDED DNA: CIRCULARITY OF ϕX-174 DNA D. Freifelder, A. K. Kleinschmidt, and R. L. Sinsheimer 5 p refs (See N64-30785 22-16)
4. INACTIVATION AND RECOVERY OF MICROORGANISMS AFTER TREATMENT WITH ULTRAVIOLET LIGHT OR OTHER MUTAGENS R. H. Haynes 34 p refs (See N64-30786 22-16)

N64-30785 California U., Berkeley Lawrence Radiation Lab.
ELECTRON MICROSCOPY OF SINGLE-STRANDED DNA: CIRCULARITY OF $\phi\chi$-174 DNA
David Freifelder, Albrecht K. Kleinschmidt, and Robert Sinsheimer (Calif. Inst. of Tech.) *In its* Suppl. to Biol. and Med. Semiann. Rept., Spring 1964 [1964] 5 p refs Partially Sponsored by NASA (See N64-30782 22-16) OTS: $1.25
(Contracts NIH-AI-01267; NIH-CA-02245)

Direct observation of DNA molecules by electron microscopy is possible if the DNA is adsorbed onto protein monolayers. DNA of ϕX-174 was prepared according to the method of Sinsheimer, and was adjusted to a concentration of 70μg/ml in 0.1 M Tris, pH 7.7. Representative single-stranded rings of ϕX-174 DNA are shown. In a typical field, about half of the DNA is easily seen as circular molecules, with filaments accounting for fewer than 2%. The remainder of the DNA consisted of molecules overlapping, aggregated, or tangled. From the results of electron-microscopy observations, it is concluded that ϕX-174 DNA is circular as well as single-stranded. P.V.E.

N64-30786 California U., Berkeley Lawrence Radiation Lab.
INACTIVATION AND RECOVERY OF MICROORGANISMS AFTER TREATMENT WITH ULTRAVIOLET LIGHT OR OTHER MUTAGENS
Robert H. Haynes *In its* Suppl. to Biol. and Med. Semiann. Rept., Spring 1964 [1964] 34 p refs Presented at the NAS-NRC Symp. on Mol. Mech. in Photobiology, Wakulla Springs, Fla. Feb. 1964 (See N64-30782 22-16)
(Grant NIH-GM-10877) OTS: $1.25

The apparent major cause of death in bacteria treated with ultraviolet light, X-rays, or nitrogen mustard (HN2) is described. These agents produce structural defects in DNA that, unless repaired, are likely to inhibit DNA synthesis or cause some error in protein synthesis, which leads to cell death. Survival is determined by the net probability that these defects either persist and prove lethal or are repaired after irradiation during the first few hours of incubation on the plating medium. P.V.E.

N64-30791* Chicago U., Ill. Committee on Biophysics
NEW APPROACHES IN CORRELATIVE STUDIES OF BIOLOGICAL ULTRASTRUCTURE BY HIGH-RESOLUTION ELECTRON MICROSCOPY
H. Fernandez-Morán Repr. from J. Roy. Microscop. Soc., v. 83, pts. 1-2, Jun. 1964 p 183-195
(Grants NsG-441-63; NIH-B-2460; NIH-C-3174; NIH-NB-04267; Contract AT (30-1)-2278)

Representative examples that illustrate characteristic features of new methodological approaches in correlative studies of native biological systems are briefly reviewed. The following are discussed: (1) fine structure of the nerve myelin sheath; (2) electron-microscope and X-ray diffraction studies of crystalline insect virus inclusions; (3) correlation of ultrastructure and function in mitochondrial membranes; (4) electron microscopy of negatively stained solubilized liquids; (5) correlated electron microscopic and biochemical studies of the *E. Coli* pyruvate dehydrocenation complex; (6) study of biological systems at liquid-helium temperatures; (7) general design concepts of a cryoelectron microscope that uses superconducting electromagnetic lenses. P.V.E.

N64-30831* Serendipity Associates, Los Angeles, Calif.
UTILIZATION OF ACCEPTANCE DATA IN A DESCRIPTIVE MODEL FOR DETERMINING MAN'S ROLE IN A SYSTEM
Harold E. Price, Ewart E. Smith, and Richard A. Behan Washington, NASA, Sep. 1964 171 p refs
(Contract NAS2-1346)
(NASA-CR-95) OTS: $3.00

This report contains the following information for use in the design of man-machine systems. (1) A partial descriptive model of the system development processes is presented for use in determining if man should be a system component, and if so what his optimal role and location should be. The model is presented in functional-flow logic. (2) The problem of system inefficiency due to nonacceptance by man of his role is analyzed. Principles for avoiding acceptance problems are described, as well as methods for measuring acceptance factors. (3) Some of the data on human capabilities and limitations is presented in a manner consistent with the model utilization and the requirements-oriented system designer. Author

N64-30859 Kentucky U., Lexington Medical Center
STUDY OF METHODS OF ASSESSMENT OF PERIPHERAL RESPONSES TO HEAT AND COLD AS INFLUENCED BY ENVIRONMENT Annual Progress Report, 1 Nov. 1963-31 Jul. 1964

Loren D. Carlson [1964] 16 p
(Contract DA-49-193-MD-2519)
(AD-603074) OTS: $1.00

The work in this continuing project has proceeded in three phases. Phase I is concerned with the standardization of methods for assessing physiological responses to cold and the general fitness of the individual. Phase 2 is concerned with equipment development for field work using the methodology for the proposed International Biological Program. Phase 3 is concerned with investigating the influence of the level of body-heat content and heat production on the responses of peripheral circulation with the consequent heat loss. A bath calorimeter has been used, and the studies outlined in this report relate heat production, heat loss, and heat debt to the skin temperature in the hand and arm when they are extended from the bath. I.v.L.

N64-30975 Stanford U., Calif.
THE CALORIC COST AND FLUID AND ELECTROLYTE BALANCE IN SIMULATED SUBARCTIC SURVIVAL SITUATIONS
T. A. Rogers, J. A. Setliff, and J. C. Klopping Ft. Wainwright, Alaska, Arctic Aeromed. Lab., Dec. 1963 52 p refs
(Contract AF 41(657)-364)
(AAL-TDR-63-16; AD-605255)

Field investigation was undertaken to determine the physiological changes concomitant with starvation in an arctic or subarctic environment. The results of these experiments indicate that man increases his caloric expenditure to 2,300 kcal/M^2/24 hr, as is expected, but that he also displays a severe dehydration. This dehydration is accompanied by a marked loss of electrolytes, primarily sodium, and it is this isotonic dehydration that causes the severe malaise and apathy typical of starvation in the cold. The Integrating Motor Pneumotachograph is presented, and its use as a device to measure caloric expenditure is described. Author

N64-31026* Melpar, Inc., Falls Church, Va.
REVIEW OF CONCEPTS AND INVESTIGATIONS FOR THE USE OF OPTICAL ROTATION AS A MEANS OF DETECTING EXTRATERRESTRIAL LIFE
Ira Blei and J. W. Liskowitz [1964] 15 p refs Presented at Fifth Intern. Space Sci. Symp. (Cospar), Florence, 8-20 May 1964
(Contracts NASr-85; NASw-557)

To achieve the greatest sensitivity, the method developed to measure optical activity had to be capable of detecting a signal at the absorption maximum where attenuation of transmitted light is greatest. This required the use of symmetrical angles where two polarizing prisms are set at fixed angles, $(+\theta)$ and $(-\theta)$, about the optic axis of an analyzer prism. Results indicate that optical activity associated with material closely related to nucleotides can be extracted from soil with neutral and, more efficiently, with aqueous alkaline washes. A.W.

N64-31031 Florida State U., Tallahassee. Inst. of Molecular Biophysics
RESEARCH IN PHOTOBIOLOGY AND PHOTOCHEMISTRY
Final Report, 1 Apr. 1963–Apr. 1964
Hans Gaffron 23 Jun. 1964 7 p refs
(Grant AF-AFOSR-62-190)
(AFOSR-64-1192; AD-602756) OTS: $1.00

Abstracts of the following research are presented. (1) flavin-sensitized photoreactions – effects of 3-(p-chlorophenyl) 1,1-dimethylurea; (2) photochemistry and metal catalysts – studies on a flavin-sensitized oxidation of ascorbate, (3) the role of light in evolution—the transition from a one-quantum to a two-quantum mechanism; (4) light-induced acetate assimilation in *Chlamydobotrys* and in other green algae (e.g. *Scenedesmus*); and (5) the investigation of the simultaneous release of hydrogen and oxygen from adapted algae in the presence of light, when carbon dioxide is absent. I.v.L.

N64-31035 Rochester U., N.Y. Miscellaneous Research Div.
IRREPARABLE INJURY FROM PROMPT RADIATION DOSES AS MEASURED BY PROTRACTED DOSES IN MICE
Henry A. Blair 11 Sep. 1964 26 p refs
(Contract W-7401-ENG-49)
(UR-649)

Experiments on mice are examined in which evenly divided or protracted exposures (resulting in death from ionization radiation) of at least 50 r per day are used to measure the long-lasting effect (irreparable injury) from a prior prompt dose or a series of doses. Because the total dose of the protracted test exposure is reduced in proportion to the prior test exposure, it is concluded that the irreparable injury from either exposure is proportional to dose. However, the data, as measured, give a value about 2.6 for the ratio of irreparable injuries of prior to test dose. Because this ratio is probably unity, the difference is attributed to the experimental method of continuing the test exposure to actual death, instead of stopping earlier in anticipation of 30-day death. Author

N64-31050 School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
A SIMPLE, INEXPENSIVE WAY TO MONITOR ELECTROCARDIOGRAMS ON AN ACTIVELY EXERCISING SUBJECT
Kenneth H. Cooper Aug. 1964 14 p refs
(SAM-TDR-64-38; AD-447979)

A simple, inexpensive means of obtaining excellent ECG recordings on an actively exercising subject is described. The recordings compare favorably with one of the standard precordial leads both in wave configuration and amplitude and have been used successfully in monitoring subjects during various physical exercises. Changes in the RS-T segment during exercise are readily apparent owing to the normal take-off of the ST segment. Muscle interference is not routinely a problem unless the exercise requires contraction of the muscles in the arm. Author

N64-31051 School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
SOUND TRANSMISSION IN HELIUM AND VARIOUS GASES AT LOW PRESSURES
Julian P. Cooke Aug. 1964 13 p refs
(SAM-TDR-64-43; AD-447980)

This investigation was concerned with the following. (1) the attenuation of sound in atmospheres of room air, 100% nitrogen, oxygen, or helium, and a 50-50 helium oxygen mixture at reduced barometric pressures; and (2) a pilot study in evaluating oral communications in a 50 50 helium oxygen atmosphere at a reduced barometric pressure. Reference tables have been prepared to assist in estimating the degree of sound reduction that will take place in each gas or gas mixture at different reduced barometric pressures. The pilot sound study has shown that tonal modification in the helium oxygen atmosphere does not result in unintelligible oral communications at 395-mm Hg atmospheric pressure. Author

N64-31052 School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
EFFECTS OF ARGININE, L-GLUTAMATE, AND PYRIDOXINE ON THE TOXICITY OF AEROZINE
Miguel A. Medina Aug. 1964 7 p refs
(SAM-TDR-64-49; AD-447981)

The toxicity of the rocket propellant Aerozine, a mixture of hydrazine and 1,1'-dimethylhydrazine (UDMH), was investigated in rats. It was found that Aerozine has an LD_{50} of approximately 120 mg/kg and produced severe convulsions within 30 minutes after intraperitoneal injection. Administration of a mixture of arginine-glutamate (4 mM/kg) and pyridoxine (0.5 mM/kg) produced a significant reduction of deaths in rats given 130 mg/kg of Aerozine. This antidotal combination was not as effective when glutamate was omitted, and injections of arginine-glutamate, glutamate-pyridoxine, arginine, l-glutamate, or pyridoxine alone did not afford any protection. Author

N64-31053 School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
PAROTID FLUID CORTICOSTEROID LEVELS AT ONE AND TWO HOURS AFTER GRADED DOSES OF ACTH
Ira L. Shannon, John R. Prigmore, and Steven C. Beering Aug. 1964 7 p refs
(SAM-TDR-64-50; AD-448081)

Parotid-fluid and serum-free 17-hydroxycorticosteroids were measured in 80 apparently normal young adult males who received graded intramuscular doses of ACTH-gel. Parotid-fluid steroid levels increased significantly at one hour after dosage for those receiving 5, 10, or 20 units of ACTH. For the two latter groups the levels remained significantly elevated at two hours after ACTH. Serum-free 17-OHCS levels at two hours after dosage increased steadily with the increase in amount of ACTH administered. These results substantiate the premise that parotid fluid steroid levels may be employed to assess adrenocortical status. Author

N64-31054 School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
VACUUM ADAPTATION OF BASEPLATE MATERIALS
James M. Terry and Roy Wahlberg Aug. 1964 12 p refs
(SAM-TDR-64-51; AD-448073)

A vacuum method for the adaptation of base-plate materials to dental casts was developed and compared to the conventional method of manual adaptation. A statistically significant saving of time resulted from the use of the vacuum method. The Contourator (model B) was employed to demonstrate the degree of adaptation provided by the test procedures. More intimate adaptation of the base-plate material to the cast and to the test die was obtained when the vacuum method was employed. Author

N64-31059 Rochester U., N.Y. Atomic Energy Project
THE USE OF GLASS MICRODOSIMETER RODS IN THE DETERMINATION OF ENERGY AND DOSE WITHIN TISSUE
H. D. Maillie and H. Mermagen 28 Aug. 1964 26 p refs
(Contract W-7401-ENG-49)
(UR-651)

A technique is described that will predict, with a reasonable degree of accuracy ($\pm$ 10%), the dose delivered to any point within a phantom exposed to photon energies from a 1000-kV-peak X-ray unit or to Co^{60} γ-radiation. The dosages predicted from the combination of the effective energy and the relative response of the lucite-covered microdosimeter rods used in the technique agree, within the limits of accuracy of the technique, with dosages determined by means of a Victoreen R-chamber. From this agreement, it is concluded that the predicted effective energies are valid. The method described will permit a determination of the effective photon energy within an irradiated mass of any construction, as well as of the exposure dose (in roentgens). Knowing the mass-energy absorption coefficient of the tissue in question, the absorbed dose in rads can be calculated. P.V.E.

N64-31073 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
AEROSPACE MEDICINE
Stanko Plevnik 19 Aug. 1964 12 p refs Transl. into ENGLISH from Lijecnicki Vjesnik (Yugoslavia), v. 85, no. 5, 1963 p 489-495
(FTD-TT-64-203/1; AD-447338)

The rise of space biophysics to deal with problems presented by man's attempts to conquer outer space is described. The medical problems presented by manned space flights are discussed, with special emphasis on weightlessness and radiation hazards. A.W.

N64-31074 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
JOURNAL OF PHYSIOLOGY Selected Articles
12 Aug. 1964 21 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), v. 9, no. 2, 1963 p 151-157; 273-276
(FTD-TT-64-386/1+2; AD-447341)

CONTENTS:

1. ON THE PRINCIPLE OF THE PHILOSOPHICAL PROBLEM OF BIOLOGICAL CYBERNETICS M. L. Gorbach p 1-12
2. FLOATING RECORDING DEVICE FOR INVESTIGATION OF MATERIAL FUNCTION OF ORGANS OF THE DIGESTIVE SYSTEM V. G. Natsik p 13-14
3. RECORDING NYSTAGMUS WITH THE AID OF A STRAIN GAUGE AND AN OSCILLOGRAPH V. T. Khlebas, N. P. Kozhukhar, and I. F. Sokolyanskiy p 15-18

N64-31084 Northrop Corp., Hawthorne, Calif. Space Labs.
MODEL ASTRONAUT RADIATION DOSE DISTRIBUTION ANALYSIS Technical Documentary Report, Jul. 1963-Sep. 1963
R. E. Fortney and G. E. Duckworth Wright-Patterson AFB, Ohio, AMRL, Feb. 1964 27 p refs
(Contract AF 33(657)-11010)
(NSL-63-172; AMRL-TDR-64-9; AD-435734)

Radiation tolerance levels vary for the different vital body organs and, therefore, the radiation dose distribution in an astronaut may be critical in future space endeavors. This study was initiated to determine analytically the dose distribution inside a model astronaut. The basis of the mathematical formulation for determining this distribution is presented. Particles of the ambient environment were assumed to impinge isotropically on the Apollo Command Module (CM). The radiation was attenuated through a typical vehicle wall thickness, and mean dose rates at various depths in a model astronaut were calculated. Four depths were investigated, each having approximately 175 points at which the dose was calculated. Two spectra were considered; one for Van Allen protons and the other representing solar flare protons. The results are presented in graphical form, giving dose versus depth in the model astronaut. Author

N64-31103 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
PHYSIOLOGICAL JOURNAL OF THE USSR Selected Articles
10 Sep. 1963 15 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 49, no. 7, 1963 p 870-872, 886-888
(FTD-TT-63-849/1+2; AD-420615)

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2. METHOD OF PHYSIOLOGICAL RESEARCH: ATTACHMENT FOR RECORDING PRESSURE, VOLUMETRIC PULSE, AND MECHANOGRAMS ON THE MPO-2-OSCILLOGRAPH N. N. Vasilevskiy and O. Ye. Guzeyev p 7-12 ref (See N64-31105 22-16)

N64-31104 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
QUANTITATIVE CHARACTERISTICS OF VASCULAR REACTION IN PLETHYSMOGRAPHIC INVESTIGATIONS
Yu. I. Krasil'nikov *In its* Physiol. J. 10 Sep. 1963 p 1-6 refs (See N64-31103 22-16)

The pronounced vascular reactions due to the mucous membrane of the nasal cavity were investigated in persons suffering with chronic tonsilitis. It was established that, under the action of a cold stimulus, the constriction of the vessels depends on the individual sensitivity of the subject investigated, on the original state of the vascular lumen, and also on the temperature and duration of the action of the stimulant. The more sensitive the person is to cold and the less he is trained and adapted to the effects of cold, the more pronounced will be the spasm of the vessels. Persons suffering with chronic tonsilitis have an enhanced sensitivity to the cooling action of distant parts of the skin. The individual sensitivity to cooling in the investigated subjects, and the peculiarity of the responsive vascular reaction due to the mucous membrane of the nasal cavity were studied in the form of a plethysmographic curve by comparing two interrelated values—the height of the pulse wave and the drop in the curve registering the degree of vascular constriction. I.v.L.

N64-31105 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
METHOD OF PHYSIOLOGICAL RESEARCH: ATTACHMENT FOR RECORDING PRESSURE, VOLUMETRIC PULSE, AND MECHANOGRAMS ON THE MPO-2 OSCILLOGRAPH
N. N. Vasilevskiy and O. Ye. Guzeyev *In its* Physiol. J. 10 Sep. 1963 p 7-12 ref (See N64-31103 22-16)

An optical airmanometer (pneumovibrator), developed for the oscillograph MPO-2, is mounted inside the body of the standard vibrator of the oscillograph. Its main element—the hermetically sealed capsule with a corrugated membrane of polystyrene—is fastened firmly on a base. One end of an elastic, thin, and narrow band is fastened to the center of the membrane, and the other end is fastened to the base. A mirror is attached to the bend in this strip, the bend is opposite a window in the body of the vibrator. When the pressure inside the capsule increases, the membrane bends, and this motion is transmitted to the mirror. The mirror turns on its axis and changes the direction of a reflected ray of light. Applications of the pneumovibrator include these: (1) the recording of the form of the volumetric pulse of the radial and carotid arteries in man; (2) the recording of a finger plethysmogram; (3) the recording of the absolute values of pressure, whether arterial, venous, cerebrospinal, or intraocular; and (4) the recording on an oscillogram of different mechanical processes—movement of the thorax, beating of the heart, motion of the lower jaw and extremities, contraction of the separate muscles, etc. I.v.L.

N64-31175 Naval Radiological Defense Lab., San Francisco, Calif.
AROUSAL REACTIONS WITH A BRIEF PARTIAL- AND WHOLE-BODY X-RAY EXPOSURE
E. L. Hunt and D. J. Kimeldorf 23 Sep. 1963 16 p refs
(USNRDL-TR-670; AD-421070)

A study was made to determine the sensitivity of the mammalian nervous system to nonvisual stimulation with ionizing radiation. Blinded rats were exposed, while asleep, to a one-second burst of X-rays, and measurements of behavioral arousal and heart rate were made to indicate activation of the central nervous system. The stimulus was immediately effective since reaction latencies of one second or less were frequently recorded. The relative incidence of arousal and of a heart rate reaction was found to be related to the radiation dose rate over the range of from 0.05 to 3.2 r/sec. The threshold dose rate was less than 0.05 r/sec. To test for regional distribution of sensitivity, additional blinded animals were exposed to a burst of X-rays at the dose rate of 1.0 r/sec with exposure limited to the head region or to the rest of the body. Since arousal was elicited with exposure of either region, it is evident that sensitivity to X-ray stimulation is widely distributed.
Author

N64-31219* Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
SPACE-CABIN ATMOSPHERES, PART I: OXYGEN TOXICITY A Literature Review
Emanuel M. Roth Washington, NASA, 1964 59 p refs Sponsored by NASA Previously announced as NASA-TN-D-2008; see N63-20754 21-16
(NASA-SP-47) GPO: $0.40

The review is divided into the following areas: (1) molecular mechanisms of oxygen; (2) the effects of high oxygen tension in animals; (3) the effects of high oxygen tension in human beings; (4) oxygen-produced atelectasis; (5) the combination of oxygen toxicity and blast effects; (6) oxygen in space-radiation problems; (7) drug therapy as protection against oxygen toxicity; and (8) the role of oxygen toxicity in selection of space-cabin atmosphere. P.V.E.

N64-31267 Joint Publications Research Service, Washington, D.C.
CHROMIUM COMPOUNDS POISONING
Ya. M. Grushko 7 Oct. 1964 35 p Transl. into ENGLISH from the book "Soyedineniya Khroma i Profilaktika Otravleniy" Moscow, 1964 p 30-45, 138-156, 302-304
(JPRS-26768; TT-64-51025)

The chapters presented cover the following: Paths of Entry of Chromium into the Organism, Accumulation of Chromium in the Organism, Removal of Chromium from the Organism During Poisoning, and Morbidity of Workers in Contact with Chromium.
Author

N64-31313 Joint Publications Research Service, Washington, D.C.
CURRENT CONCEPTS OF MECHANISMS OF THE PROTECTIVE EFFECT OF CHEMICAL COMPOUNDS AGAINST RADIATION
V. A. Baraboy 12 Oct. 1964 42 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 58, no. 1 (4), Jul.-Aug. 1964 p 52-73
(JPRS-26842; TT-64-51099) OTS: $2.00

Presented is a survey of literature concerned with the basic mechanisms of various chemicals giving antiradiation protective effects along with the chemical properties of the various preparations and their chemical structure and pharmacological properties. The mechanisms involved on three different biological levels are considered—atomic-molecular level, cell level, and organism level. P.V.E.

N64-31315 Mississippi State U., State College
PHYSICAL, CHEMICAL, AND MICROBIOLOGICAL EVALUATION OF ELECTROCHEMICAL DEGRADATION OF HUMAN WASTES Informal Progress Report No. 8. 1 Apr.–30 Jun. 1964 30 Jun. 1964
Robert G. Tischer [1964] 29 p
(Contract AF 41(609)-1633)
(AD-447801)

Microelements normally used in Knop's medium were added independently to 120 hour 1/10 EDO. With the exception of manganese chloride, the increase in dry weight of cells when each was used was about the same as plain EDO. But the medium with manganese-added chloride increased the dry weight of cells as much as the EDO control with all the microelements added. Factors studied might limit the growth of *Chlorella* 71105 in the EDO and demonstrate whether a deficiency or toxicity exists. It was determined that moderate amounts of total Kjeldahl nitrogen, nitrates, chlorides, orthophosphates, and sulfates remained in 72-hour 1/10 EDO after 48 hours' growth, when employed as an algal medium; it is evident that a shortage of one of the components investigated is not responsible for the limited growth of *Chlorella* 71105. An investigation was made to determine whether selected cations plate out on the cathodes during electrolysis of DO. To separate the evolved gases and to study the anode and cathode reactions individually, experiments were performed with a U tube as the electrolysis vessel R.L.K.

N64-31319 Rochester U., N.Y.
THE FATE OF RADON INGESTED BY MAN
John B. Hursh, Donald A. Morken, Thomas Davis, and Arvin Lovaas 10 Jul. 1964 43 p refs
(Contract W-7401-ENG-49)
(UR-648)

Four experiments were performed in which two subjects on two occasions drank approximately 1μc radon plus daughters in 100 ml of water. Measurements on radon loss in expired air, whole body radium C content, and radon in the blood permit the calculation of an $(MPC)_w$ of 2.0×10^{-4} μc/ml for occupational exposure. This is based on the stomach as the critical organ, but doses to the lung, kidney, and liver are estimated. Author

N64-31338* National Aeronautics and Space Administration, Washington, D.C.
USING RADIOTELEMETRY TO INVESTIGATE GASTRIC EVACUATION [PRIMENENIYE RADIOTELEMETRII DLYA ISSLEDOVANIYA EVAKUATORNOY FUNKTSII ZHELUDKA]
Ye. B. Babskiy, A. S. Belousov, I. I. Malkiman, A. P. Nesterova, and A. S. Sorin Aug. 1964 4 p ref Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 156, no. 3, 1964 p 719–720
(NASA-TT-F-9060) OTS: $1.00 fs; $0.50 mf

Data are presented that show that a pH radiocapsule attached to the end of a duodenal tube can be used to investigate gastric evacuation in healthy persons, as well as in patients. Patterns of pH variation in time in a healthy person and in a patient with duodenal ulcer are given, and it is concluded, after studying five such patients, that their gastric-evacuation function was impaired and that the secretion of their gastric glands was more rapid than that in healthy persons. D.E.W

N64-31341 Joint Publications Research Service, Washington, D.C.
PHARMACOLOGICAL CHARACTERISTICS OF SEVERAL PREPARATIONS
30 Sep. 1964 44 p refs Transl. into ENGLISH from Farmakol. i Toksikol. (Moscow), v. 28, no. 3, 1964 p 331–349, 362–367
(JPRS-26645; TT-64-41903) OTS: $2.00

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1. THE PHARMACOLOGY OF THE BRAIN STEM N. A. Kharauzov p 1–3 refs (See N64-31342 23-16)
2. PHARMACOLOGICAL RESEARCH IN HIGH-MOLECULAR ANTICOAGULANTS N. V. Petryayevskaya and A. V. Valdman p 4–11 refs (See N64-31343 23-16)
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7. DISTRIBUTION AND REMOVAL OF B-MERCAPTOPROPYLAMINE AND TAGGED S_{35} FROM THE ORGANISM OF MICE G. V. Kalistratov and Ye. F. Romantsev p 36–41 refs (See N64-31348 23-16)

N64-31342 Joint Publications Research Service, Washington, D.C.
THE PHARMACOLOGY OF THE BRAIN STEM
N. A. Kharauzov *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 1–3 refs (See N64-31341 23-16) OTS: $2.00

The blinking response of various animals to administration of hydrobromic arecoline and to phenamine is discussed. The experimental data suggest a suppression of arecoline phenomena by cholinolithics (atropine, scopolamine, methyldiazile, and pentaphenom) and suppression of phenamine phenomena by aminazine and preparation IEM-336 (amide para-aminophenylacetic acid and meta-phenylisopropylamine). M.P.G.

N64-31343 Joint Publications Research Service, Washington, D.C.
PHARMACOLOGICAL RESEARCH IN HIGH-MOLECULAR ANTICOAGULANTS
N. V. Petryayevskaya and A. V. Valdman *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 4–11 ref (See N64-31341 23-16) OTS: $2.00

The relationship between molecular weight and duration of anticoagulant activity was established for the preparation Vinol-PK, a polymerization product of pelentan (neodicoumarin) and polyvinyl alcohol. The anticoagulant action was found to increase with increasing molecular weight, and the duration of the anticoagulant effect was found to increase with increased dosage. Single administration of the high-molecular weight fraction slowed down blood coagulation for 15 to 17

days; repeated administration at a 10-day interval was effective for a month. Intravenous and enteral administration of Vinol-PK were found to be equally effective. M.P.G.

N64-31344 Joint Publications Research Service, Washington, D.C.

ON THE EFFECT OF ANESTHESIA ON THE REACTION OF HYPOPHYSO-ADRENAL SYSTEM TO STRESS

E. R. Bagramyan *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 12–19 refs (See N64-31341 23-16) OTS: $2.00

The effect of urethan anesthesia on the concentration of ascorbic acid in the adrenal glands of rats was studied. Against the background of this anesthesia, the reaction of adrenal glands to the unilateral adrenalectomy, X-ray, and administration of ACTH was investigated. For comparison, the effect of nembutal and ether anesthesia was tested. Author

N64-31345 Joint Publications Research Service, Washington, D.C.

FORMS OF ADRENAL MORPHOPHYSIOLOGICAL REORGANIZATION FROM THE EFFECT OF STRONG "STRESSOR" AND HIGH ACTH DOSES

V. I. Prilutskiy *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 20–26 refs (See N64-31341 23-16) OTS: $2.00

During the action of a strong "stressor" and of large doses of ACTH on an organism, two quantitatively different forms of morphophysiological reorganizations are observed: (1) the entrance of the majority of the cells into active phases of the secretory cycle, and (2) an increase of the general mass of hormonopoietic elements instead of hypertrophy and hyperplasia, which is accompanied by the exit of a part of the cells from their active phases of the secretory cycle. The nature of the morphological reorganization of the adrenal cortex to a large degree depends on the intensity and duration of the action of the factors evoking it. Author

N64-31346 Joint Publications Research Service, Washington, D.C.

PHARMOCOLOGICAL CHARACTERISTICS OF TETRAMETHYLCYSTAMINE

Yu. E. Strel'nikov *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 27–33 refs (See N64-31341 23-16) OTS: $2.00

Further investigation of the pharmacological properties of tetramethylcystamine (TMC) was conducted. The tests were made on 20 cats, anesthetized with urethan. Arterial pressure was registered by a mercury manometer, connected to a common carotid artery, and respiration, with a Marrey's capsule connected to a trachea. Simultaneously the tonus of the third eyelid was recorded. The solutions of the preparation were injected into the vena femoralis. During an intravenous administration of TMC in 1 mg/kg dose a minimum hypotension and respiratory stimulation were observed. The effect increased with the increase of the dose. In doses of 40 to 50 mg/kg, TMC lowered the blood pressure to 40 to 50 mm. Hypotension continued for 1 1/2 to 2 hours. Respiration first increased and became more rapid and later decreased to a complete stop.

Author

N64-31347 Joint Publications Research Service, Washington, D.C.

EFFECT OF URANIUM ON THE ALKALINE PHOSPHATASE OF SOME ORGANS OF RATS

I. V. Shust *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 34–35 (See N64-31341 23-16) OTS: $2.00

The effect of subcutaneous administration of a 0.15-mg dose of uranyl nitrate on the alkaline phosphatase activity of the liver, kidney, spleen, and heart muscle of rats was investigated. In all cases, a change in alkaline phosphatase activity resulted, followed by a return to normal about 10 days after cessation of uranium-salt administration. In heart muscle, the alkaline phosphatase activity at first increases in the nuclei of the myocardium but, after prolonged administration, the enzyme activity almost disappears. Prolonged administration causes a leukocyte infiltration in liver lobules and a decrease in the quantity of granulocytes in the spleen. The phosphatase activity of the remaining granulocytes becomes more intense. Atypical localization of phosphatase activity in the kidney is noted after prolonged administration, but the total activity remains at about the control level. M.P.G.

N64-31348 Joint Publications Research Service, Washington, D.C.

DISTRIBUTION AND REMOVAL OF B-MERCAPTOPROPYLAMINE AND TAGGED S^{35} FROM THE ORGANISM OF MICE

G. V. Kalistratov and Ye. F. Romantsev *In its* Pharmacol. Characteristics of Several Preparations 30 Sep. 1964 p 36–41 refs (See N64-31341 23-16) OTS: $2.00

The β-mercaptopropylamine (MPA) was synthesized and in tests with small laboratory animals was found to be a more effective remedy against lethal doses of ionizing radiation than β-mercaptoethylamine. The goal of this investigation was to study the dynamics of the distribution of β-mercaptopropylamine through the organs and tissues of mice under normal conditions and after irradiation with X-rays of lethal doses. In addition, the effect of removal of MPA from the urine and feces of healthy and irradiated animals, and the presence in the urine of mixed, nonorganic, and ether-combined sulfur were studied. Author

N64-31440 Joint Publications Research Service, Washington, D.C.

THE TRAINING OF SOVIET COSMONAUTS

V. G. Denisov 7 Oct. 1964 145 p refs Transl. into ENGLISH of the book "Kosmonavt Letayet—Na Zemle" Moscow, 1964 p 1–151

(JPRS-26762; TT-64-51019) OTS: $4.00

A popular account is given of the methods and technical means that permit reconstructing on earth the unusual conditions of cosmic flight. Centrifuges, soundproof chambers, pressure chambers, rocket dollies, training apparatus, and a multitude of means of electronics and cybernetics are helping to prepare cosmonauts for future flights. Author

N64-31445* National Aeronautics and Space Administration, Washington, D.C.

"ANILINE POISONING"—GASTRIC LAVAGE—WATER INTOXICATION ['ANILINFORGIFTNING—MAGSKOLJNING—VATTENFORGIFTNING']

Stig Sjolin Aug. 1964 7 p refs Transl. into ENGLISH from Nord. Med. (Stockholm), v. 46, 1951 p 1494–1495

(NASA-TT-F-9056) OTS: $1.00 fs; $0.50 mf

Because of the high toxicity of aniline, the treatment generally followed in Sweden for children known to have sucked or chewed on an aniline pencil was gastric lavage and thorough

cleaning of the oral mucosa. This paper reappraises the question. The aniline found in aniline pencils is not identical with true aniline; it consists of triphenylmethanes or, more precisely, pararosanilines. The toxicity of this substance is low, although in high concentration it has irritating effects. It is suggested that the symptoms attributed to sucking on aniline pencils are more readily accounted for by water intoxication due to the absorption of excessive quantities of water during gastric lavage. The omission of lavage and the substitution of suitable nourishment is advised in these cases. Because of the danger of water intoxication, it is suggested that physiological saline should always be used in gastric lavage. R.L.K.

N64-31457 Joint Publications Research Service, Washington, D.C.

REFLEX ACTION OF THE NERVOUS SYSTEM

16 Sep. 1964 126 p refs Transl. into ENGLISH of 8 articles from Zh. Vysshei Nervnoi Deyatel'nosti (Moscow), v. 14, no. 2, 1964 p 195–222, 239–245, 277–300, 326–336 (JPRS-26427; TT-64-41685) OTS: $4.00

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2. SOME PECULIARITIES OF MAN'S VOLUNTARY AND INVOLUNTARY EMOTIONAL REACTIONS P. V. Simonov, M. N. Valuyeva, and P. M. Yershov p 17–28 refs (See N64-31459 23-14)

3. CHANGES IN THE RELATIONSHIPS OF THE ORIENTING AND MOTOR CONDITIONED REFLEXES UNDER THE INFLUENCE OF ATROPINE E. A. Kostandov p 29–47 refs (See N64-31460 23-14)

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5. THE REPRESENTATION OF THE VISUAL ANALYSOR IN THE CORTEX OF THE CEREBRAL HEMISPHERES V. G. Skrebitskiy and Ye. G. Shkol'nik-Yarros p 64–82 refs (See N64-31462 23-16)

6. PATHWAYS FOR THE CONDUCTION OF PRIMARY SPECIFIC INFORMATION IN THE SYSTEM OF THE VISUAL ANALYSOR N. N. Lyubimov p 83–95 refs (See N64-31463 23-16)

7. INTERACTION OF THE EXCITATORY AND INHIBITORY PROCESSES IN THE ACOUSTIC ANALYSOR OF A DOG IN RESPONSE TO PURE TONES N. N. Lazuko p 96–105 refs (See N64-31464 23-16)

8. SOME DATA ON THE RELATIONSHIP BETWEEN SLOW AND IMPULSE ACTIVITY IN THE PALEOCORTEX OF THE LIZARD L. G. Voronin, K. G. Gusel'nikova and V. I. Gusel'nikov p 106–121 refs (See N64-31465 23-16)

N64-31458 Joint Publications Research Service, Washington, D.C.

INDIVIDUAL DIFFERENCES AS FACTORS IN THE RESPONSES OF BRAIN POTENTIALS TO RHYTHMICAL LIGHT STIMULATION

V. D. Nebylitsyn *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 1–16 refs (See N64-31457 23-16) OTS: $4.00

The paper compares the following indicators: photic driving in a range from 5 to 22 cps; orienting and conditioned-reflex blockade of alpha rhythm during exposure to auditory and photic stimuli, or combinations thereof; and EEG components marked out with the help of a frequency analyzer. The results of the quantitative analysis of these correlations, expressed as coefficients, were computed by the moments method with the help of an electronic computer. A.W.

N64-31459 Joint Publications Research Service, Washington, D.C.

SOME PECULIARITIES OF MAN'S VOLUNTARY AND INVOLUNTARY EMOTIONAL REACTIONS

P. V. Simonov, M. N. Valuyeva, and P. M. Yershov *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 17–28 refs (See N64-31457 23-16) OTS: $4.00

An experimental study was conducted on 21 healthy persons of both sexes to determine manifestations of voluntarily evoked and involuntarily aroused defensive reflexes conditioned by anticipation of strong painful stimulation. It is concluded that sense impressions, mentally reproduced by a person anticipating an impending painful stimulus, cause intense shifts in heart rhythm, galvanic skin response, and EEG frequency spectrum even when no such stimulus follows. A.W.

N64-31460 Joint Publications Research Service, Washington, D.C.

CHANGES IN THE RELATIONSHIPS OF THE ORIENTING AND MOTOR CONDITIONED REFLEXES UNDER THE INFLUENCE OF ATROPINE

E. A. Kostandov *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 29–47 refs (See N64-31457 23-16) OTS: $4.00

The influence of atropine was studied on 36 schizophrenia patients with apathy-abulia syndrome. Psychic deficiency, pronounced to some degree, was found in the patients during clinical examination. The majority of patients had had the disease for over five years. Delusions of reference and persecution were noted in some cases, but they were unsystematized and fragmentary, were incidentally expressed by the patients, and did not determine their behavior. All the patients were languid, apathetic, and inactive; as a rule, they did not enter into conversation themselves, and answered questions in monosyllables. They associated but little with those around them. Often observed were argumentation and paralogia, and sometimes incoherence of thought. Usually the patients manifested no uneasiness over their legal situation or their future fate. Emotional depression or dullness was clinically noted in all the patients. Author

N64-31461 Joint Publications Research Service, Washington, D.C.

THE PHYSIOLOGICAL SIGNIFICANCE OF SOUNDS OF THE HUMAN VOICE

P. S. Shpakov *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 48–63 refs (See N64-31457 23-16) OTS: $4.00

Observations were conducted on children of ages 3 to 15. Their responses to a simultaneous complex stimulus consisting of both physical agents (lights, buzzers, etc.) and sounds of the human voice were noted. In general, reactions to the sound of the human voice were extinguished later than reactions to the physical components. The sound of the human voice, because it has some qualitative parameters different from those of the lights and buzzers used, introduces new interrelations in physiological functions. A.W.

N64-31462 Joint Publications Research Service, Washington, D.C.

THE REPRESENTATION OF THE VISUAL ANALYSOR IN THE CORTEX OF THE CEREBRAL HEMISPHERES

V. G. Skrebitskiy and Ye. G. Shkol'nik-Yarros *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 64-82 refs (See N64-31457 23-16) OTS: $4.00

The morphological connections of different regions of the cerebral cortex were compared with electrical responses evoked therefrom. The experiments were conducted on dogs in whom electrodes had been planted in different regions of the cerebral cortex. Some of the conclusions reached were these: Single light stimulations evoke in the cortical nucleus of the visual analyser a response, including both a primary component with a latent period of 15 to 25 milliseconds and a secondary component with a latent period of 30 to 50 milliseconds. Outside the cortical nucleus, primary reactions were pronounced in the medial suprasylvian gyrus. There are direct centripetal connections of the retina with the cortex. A.W.

N64-31463 Joint Publications Research Service, Washington, D.C.

PATHWAYS FOR THE CONDUCTION OF PRIMARY SPECIFIC INFORMATION IN THE SYSTEM OF THE VISUAL ANALYSOR

N. N. Lyubimov *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 83-95 refs (See N64-31457 23-16) OTS: $4.00

The investigation of the pathways was conducted on 15 dogs. At least three pathways were differentiated: the classic visual pathway from the retina; a supplemental pathway from the visual region of each hemisphere through the posterior section of the corpus callosum to the opposite visual center; and a well-developed neuronal system that switches over to the other side at the level of the midbrain and reaches the opposite cortical visual center. Responses may be associated with the propagation of an excitation over each of these pathways, over any two of them, or over all three. A.W.

N64-31464 Joint Publications Research Service, Washington, D.C.

INTERACTION OF THE EXCITATORY AND INHIBITORY PROCESSES IN THE ACOUSTIC ANALYSOR OF A DOG IN RESPONSE TO PURE TONES

N. N. Lazuko *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 96-105 refs (See N64-31457 23-16) OTS: $4.00

The effect was studied of pure tones of identical loudness, but of varying frequency, on four dogs with the ducts of their parotid glands exposed. Conditioned responses to tones were developed in all the dogs, as were certain inhibitory responses. A.W.

N64-31465 Joint Publications Research Service, Washington, D.C.

SOME DATA ON THE RELATIONSHIP BETWEEN SLOW AND IMPULSE ACTIVITY IN THE PALEOCORTEX OF THE LIZARD

L. G. Voronin, K. G. Gusel'nikova, and V. I. Gusel'nikov *In its* Reflex Action of the Nervous System 16 Sep. 1964 p 106-121 refs (See N64-31457 23-16) OTS: $4.00

Experiments were conducted on lizards that were immobilized with Diplacin. From test data, it was concluded, among other things, that various kinds of impulsations converge into individual neurons, arriving mainly along nonspecific polysynaptic pathways; and that the initial functional state of the animal is decisive in determining the character of the reaction to a stimulus of individual neurons. A.W.

N64-31471 Tennessee U., Oak Ridge Agricultural Research Lab.

RADIOBIOLOGY Semiannual Progress Report, 1 Jul.-31 Dec. 1963

Washington, AEC, Aug. 1964 136 p refs
(Contract AT(40-1)-GEN-242)
(ORO-624) OTS: $2.50

Results are reported on the status of animals surviving irradiation, the effects of radiation on the animal reproductive cycle, analyses of death patterns of irradiated animals, the physiological effects of whole-body irradiation, fission-product metabolism in animals and poultry, fission-product chemistry of soils, the biochemistry of fission-product elements, and the effect of penetrating radiation on plant tissue and the environmental factors modifying such effects. R.L.K.

N64-31474 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.

WHO MAY BECOME AN ASTRONAUT

M. A. Novikov 23 Jul. 1964 11 p refs Transl. into ENGLISH from Zdorov'ye (USSR), no. 4, 1963 p 4-7
(FTD-TT-64-260/1; AD-605236)

The necessity for the astronaut to withstand the factors of space flight has led to a variety of psychological tests. The importance of group as well as individual selection is mentioned, and some of the features of group solidarity are discussed. R.L.K.

N64-31508 Office of Naval Research, Washington, D.C. Engineering Psychology Branch

VISUAL, DISPLAY, AND CONTROL PROBLEMS RELATED TO FLIGHT AT LOW ALTITUDE

James W. Miller, ed. [1964] 57 p refs Proc. of a Symp., jointly sponsored by Autonetics, held in Anaheim, Calif., 3-5 Mar. 1964
(ACR-95; AD-602823) OTS: $3.00

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N64-31509 Human Factors Research, Inc., Los Angeles, Calif.

GEOGRAPHIC ORIENTATION DURING LOW-ALTITUDE FLIGHT

James J. Mc Grath *In* ONR Visual, Display, and Control Problems Related to Flight at Low Altitude [1964] p 13-25 ref (See N64-31508 23-14) OTS: $3.00
(Contract Nonr-4218(00))

An analysis is presented showing that geographic disorientation (as differentiated from spatial disorientation) occurs frequently enough in present-day aviation operations to significantly affect the success of those operations. A statistical description of actual incidences of geographic disorientation was undertaken to delineate the areas of human performance

research needed to reduce the incidence of such disorientation. A systematic research plan is outlined that includes motion-picture methods to study visual-cue fidelity, terrain-model methods to study pilot mobility, and verification by actual field studies. M.P.G.

N64-31511 Autonetics, Anaheim, Calif.
VISUAL ASPECTS OF LOW-LEVEL FLIGHT
Harry L. Snyder *In* ONR Visual, Display, and Control Problems Related to Flight at Low Altitude [1964] p 27-37 refs (See N64-31508 23-14) OTS: $3.00

Those parameters of low-altitude flight that have the most influence on visual performance are identified, and the extent to which each parameter affects dynamic visual performance is indicated. The parameters are separated into two classes: (1) physical and geometric factors; and (2) human visual limitations. The physical and geometric factors considered are these: masking; size and shape of targets; illuminance, luminance, and contrast; number of objects in the visual field; and ground speed and time available for search. The human visual limitations are considered in relation to the effects of object luminance and contrast, angular velocity and blur, and static vs dynamic acuity. Some possible approaches to research in low-level visual problems are discussed. M.P.G.

N64-31512 Air Force Systems Command, Wright-Patterson AFB, Ohio Behavior Science Lab.
HUMAN PERFORMANCE DURING VIBRATION
Charles S. Harris and Richard W. Shoenberger *In* ONR Visual, Display, and Control Problems Related to Flight at Low Altitude [1964] p 38-47 refs (See N64-31508 23-14) OTS: $3.00

The problems associated with determining the effects of buffeting and vibration on human performance in low-level high-speed flight missions are discussed; experimental data are reviewed; and some guidelines for vehicle designers and human factors researchers are presented. The general agreement between frequency-maximum acceleration curves of tolerance to vibration for short times (1 hour or less) and long time exposures is demonstrated graphically. These data are discussed in relation to both visual acuity experiments and tracking performance. Systematic behavioral studies are needed in the low-g range within the frequencies from 1 to 20 cps in order to study performance changes and to specify, for a given frequency, at what intensity level significant decrement begins to occur. The need for a test to identify vibration-sensitive individuals is also indicated. M.P.G.

N64-31535 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
THE POSSIBILITIES OF REPLACING THE NITROGEN IN THE AIR WITH HELIUM IN SPACE-VEHICLE CABINS AND THE EFFECTIVENESS OF USING A HELIUM-OXYGEN MIXTURE FOR VENTILATION OF A SPACE-PRESSURE SUIT
A. G. Dianov *In its* Cosmic Res., Vol. 2, No. 3, 1964 28 Jul. 1964 p 224-236 refs (See N64-21522 23-29)

Two tests, lasting 22 and 30 days, were carried out on human beings. It was established that it is possible for a human being to spend a prolonged period of time (up to 25 days) in an airtight cabin in whose atmosphere the nitrogen of the air has been replaced by helium. In view of the high thermal conductivity of the helium-oxygen mixture, the zone of thermal comfort for the test subjects was a temperature range of 24.5° to 27.5° C during the day, and from 26° to 29° C at night. A change in the speech patterns of the test subjects was expressed in a shift of the speech spectrum toward frequencies higher by a magnitude of 0.7 of an octave. Author

N64-31536 Joint Publications Research Service, Washington, D.C.
PHYSIOLOGICAL RESEARCH IN THE USSR
17 Sep. 1964 64 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), v. 10, no. 3, 1964 p 301-306, 308-312, 360-365, 379-382, 390-396, 403-411
(JPRS-26444; TT-64-41702) OTS: $3.00

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2. AN ALGORITHM FOR ANALYZING THE IMPULSE ACTIVITY OF NEURONS WITH AN ELECTRONIC COMPUTER M. V. Yarovits'kyy p 9-15 refs (See N64-31538 23-16)

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6. ORIGIN OF THE POSITIVE COMPONENT OF THE EVOKED POTENTIAL OF THE TECTUM OPTICUM OF THE TOAD E. O. Semenyuk p 33-36 refs (See N64-31542 23-16)

7. SPONTANEOUS MOTOR ACTIVITY IN CATS AND ITS RECORDING AND ALTERATION AFTER BILATERAL DESTRUCTION OF THE CAUDATE NUCLEI M. M. Oleshko p 37-40 (See N64-31543 23-16)

8. METHOD OF INVESTIGATING THE ELECTRICAL PROPERTIES OF NERVE AND MUSCLE FIBERS BY MEANS OF SURFACE EXTRACELLULAR ELECTRODES D. P. Artemenko and M. F. Shuba p 41-47 refs (See N64-31544 22-16)

9. ELECTROMETRIC AMPLIFIER DURING USE OF HIGH-RESISTANCE GLASS MICROELECTRODES V. F. Nikitenko, B. Ya. P'yatygors'kyy and Z. O. Sorokina p 48-51 refs (See N64-31545 23-16)

10. VARIATION IN THE METHOD OF INSERTING ELECTRODES IN ACUTE AND CHRONIC EXPERIMENTS A. P. Kobernik p 52-55 refs (See N64-31546 23-16)

N64-31537 Joint Publications Research Service, Washington, D.C.
UNIVERSAL DEVICE FOR INPUT OF PHYSIOLOGICAL CHARACTERISTICS INTO AN ELECTRONIC COMPUTER
K. O. Shkabara and Yu. S. Rubashov *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 1-8 refs (See N64-31536 23-16) OTS: $3.00

A device for taking recorded physiological characteristics and changing the data to a usable computer input is described. The device is designed to recreate information previously recorded on magnetic tape during physiological experimentation, to convert this information into binary code, and to introduce the information into the computer. Information in the

form of discrete pulses (electrical activity of the neurons), registered with microelectrodes and continuous characteristics of the organism's physiological activity (electroencephalograms, blood pressure curves, respiration curves, etc.) is synchronously recorded on standard 6.3-mm magnetic tape for subsequent separate and joint analysis in the computer. Supplementary information is likewise recorded for insertion into the computer (the beginning and ending of stimuli, intervals during which analysis must be carried out, etc.). The device is comprised of a tape-transporting mechanism, three to five magnetic heads, a generator and time-pulse counter, a logic control circuit, and a power supply. P.V.E.

N64-31538 Joint Publications Research Service, Washington, D.C.

AN ALGORITHM FOR ANALYZING THE IMPULSE ACTIVITY OF NEURONS WITH AN ELECTRONIC COMPUTER

M. V. Yarovits'kyy *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 9-15 refs (See N64-31536 23-16) OTS: $3.00

This article describes a computer algorithm for analyzing the impulse activity of the central neurons. The impulse activity is considered as an unstable random stream of uniform actions with a periodic fundamental function. When some stimulus is applied to the organism—intravenous or intra-arterial injection of chemical agents, distention of the bladder, electrical irritants—a nonrandom aperiodic component is superimposed on the fundamental function and represents the cell's response to the stimulus. The fundamental function cannot be renewed with the impulse activity of the neuron. It can only be approached by plotting the frequency graph (change of frequency in time), which is the sum of the fundamental function and some unstable random process without an average value.

Author

N64-31539 Joint Publications Research Service, Washington, D.C.

SOME PROBLEMS OF THE ADAPTATION OF THE ORGANISM TO CHRONIC OXYGEN STARVATION

V. I. Voytkevich *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 16-24 refs (See N64-31536 23-16) OTS: $3.00

The adienorrhytic changes in the brain and the changes in the blood system during the adaptation of organisms to conditions of chronic hypoxia were studied. The study was conducted on white rats kept in hypoxia chambers and on human beings during a trip into a mountain area. It was established that the amount of blood in the brains of the rats increased and that the result of a 1-month's stay of the rats in hypoxia conditions resulted in an increase of blood in the brain by an average of 50 ±1 to 73 ±8 microliters per gram of brain (e.g., by 46%). In the human beings examined, the amount of hemoglobin in the peripheral blood increased by an average of 20% during a 2-month's sojourn in the mountains. In general, it is concluded that three of the more important defenses of an organism to hypoxia are these: (1) the appearance in the blood of a large number of hemopoietins; (2) an increase in the amount of blood in the brain; and (3) changes in the oxygen-binding properties of the hemoglobin. P.V.E.

N64-31540 Joint Publications Research Service, Washington, D.C.

EFFECT OF CENTIMETER- AND METER-RANGE ELECTROMAGNETIC WAVES ON THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN HUMAN BLOOD

E. L. Revuts'kyy and F. M. Eydel'man *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 25-28 refs (See N64-31536 23-16) OTS: $3.00

The blood histamine content and cholinesterase activity in 10 subjects were investigated before and after treatment with 22.12-m and 12.6-cm wavelength high-frequency electromagnetic radiation. It was found that the local application of a high-frequency electromagnetic field is accompanied by changes in blood histamine content and by a change in the activity of the specific cholinesterase of the erythrocytes. It was also established that the changes depend on the wavelength of the high-frequency electromagnetic field applied. The application of 22.12-m electromagnetic vibrations is accompanied by a decrease in the blood histamine content, while the activity of the specific cholinesterase of the erythrocytes remains unchanged. When 12.6-cm microwaves were applied, the blood histamine content remained unchanged, but the activity of the specific cholinesterase of the erythrocytes increased. P.V.E.

N64-31541 Joint Publications Research Service, Washington, D.C.

VARIABILITY OF PRIMARY EVOKED POTENTIALS RECORDED UNIPOLARLY FROM THE SURFACE OF THE AUDITORY ZONE OF THE CORTEX OF A CAT IN THE STATE OF NARCOSIS

O. F. Dembnovets'kyy *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 29-32 (See N64-31536 23-16) OTS: $3.00

Study of the variability of primary evoked potentials (PEP) is important because their first positive phase on the surface of the cortex is considered an index of excitation in the depths of the cortex, and the negative phase is considered an index of excitation at the surface of the cortex. It was found that under certain conditions of stimulation, different PEP shapes may be recorded from the same spot in the cortex in the same specimen, up to the point where a PEP with a first positive phase is converted into a PEP with a first negative phase against a background of insignificant quantitative changes in the PEPs that originate at this time between different depth levels. From these results, it is concluded that primary evoked potentials recorded unipolarly from the cortical surface do not always correspond to the process that is provoked by the afferent impulses at the time between the different depth levels. P.V.E.

N64-31542 Joint Publications Research Service, Washington, D.C.

ORIGIN OF THE POSITIVE COMPONENT OF THE EVOKED POTENTIAL OF THE TECTUM OPTICUM OF THE TOAD

E. O. Semenyuk *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 33-36 refs (See N64-31536 23-16) OTS: $3.00

In the experiment discussed, the optical nerve of a toad was subjected to isolated rectangular stimuli of 0.5- to 1-msec duration. The evoked potentials were unipolarly recorded at the contralateral tectum opticum and registered on a cathode oscilloscope. Conclusions reached on the basis of the experiment include the following: (1) The slow waves of the evoked potential of the tectum opticum of the toad during stimulus of the optic nerve result from the algebraic addition in the recording electrode area of two components—the negative and the positive—each of which is composed of two slow oscillations. (2) The positive component in its pure form may be recorded from the center of the dorsal portion of the tectum opticum if its intrinsity activity is removed by local application of solutions of GABA, KCl, or alcohol; by local destruction of the area; or by depriving it of afferent impulses by transections. P.V.E.

N64-31543 Joint Publications Research Service, Washington, D.C.

SPONTANEOUS MOTOR ACTIVITY IN CATS AND ITS RECORDING AND ALTERATION AFTER BILATERAL DESTRUCTION OF THE CAUDATE NUCLEI

M. M. Oleshko *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 37-40 (See N64-31536 23-16) OTS: $3.00

A photoelectric method was used to study the number of motions of animals (cats of both sexes) before and after cutting their caudate nuclei. The spontaneous motor activity of nine cats (three before, and six before as well as after the operation) was studied. It was found that spontaneous motor activity increased after cutting the caudate nuclei by a factor of more than 10, as compared with maximum motor activity of the animals before operation, and that the activity increased by hundreds of times in the 2 days after destruction of the caudate nuclei. It is concluded that the increased spontaneous motor activity is directly linked to the destruction of the caudate nuclei and does not depend on season, sex, or previous administration of narcotics. P.V.E.

N64-31544 Joint Publications Research Service, Washington, D.C.

METHOD OF INVESTIGATING THE ELECTRICAL PROPERTIES OF NERVE AND MUSCLE FIBERS BY MEANS OF SURFACE EXTRACELLULAR ELECTRODES

D. P. Artemenko and M. F. Shuba *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 41-47 refs (See N64-31536 23-16) OTS: $3.00

A "sucrose bridge" method for measuring the membrane potential of a bundle of nerve fibers is discussed. The method consists mainly of the following. The section of the nerve between the recording electrodes is washed in a circulation isotonic sucrose solution with a high intrinsic resistance (10^6 ohm-cm). Through this procedure, the bypass effect of the surface layer of the fluid covering the nerve and the nerve fibers between the recording electrodes is so far diminished that the potential of the nerve may be measured at 80% to 90% of the true value of the membrane potential of the fibers. The measured value of the electric potentials equals their true value multiplied by a "short circuit factor" that is computed from the formula $R_p/(R_p + R_n)$, where R_p is the resistance of the external solution per unit of length, and R_n is the plasma resistance per unit of length. Equipment used in the application of the method is also described. P.V.E.

N64-31545 Joint Publications Research Service, Washington, D.C.

ELECTROMETRIC AMPLIFIER DURING USE OF HIGH-RESISTANCE GLASS MICROELECTRODES

V. F. Nikitenko, B. Ya. P'yatygors'kyy, and Z. O. Sorokina *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 48-51 refs (See N64-31536 23-16) OTS: $3.00

A two-tube amplifier for use with microelectrodes is described. An electrometric-type EM-4 triode is used as the input tube. This tube is chosen so that the current through the amplifier can be reduced to 10^{-13} A. The second stage is a balanced cathode repeater using a 6N3P tube. An electronic potentiometer with a 0 to 50μA indicator is used with the cathode repeater. To eliminate induction between the first and second stages, a low-frequency RC filter is inserted. The sensitivity of the whole unit is 0.25 mV per scale division of the self-scribing device. Its stability after a half-hour warmup is no less than 0.1 to 0.15 mV/hr. The effectiveness of the device was tested in an investigation of the activity of K and Na ions in the fibers of the sartorius muscles of toads. A brief description of the experiments is presented. P.V.E.

N64-31546 Joint Publications Research Service, Washington, D.C.

VARIATION IN THE METHOD OF INSERTING ELECTRODES IN ACUTE AND CHRONIC EXPERIMENTS

A. P. Kobernik *In its* Physiol. Res. in the USSR 17 Sep. 1964 p 52-55 refs (See N64-31536 23-16) OTS: $3.00

A method, using fast-setting plastic employed in making dental prostheses (styracryl) for fastening electrodes to the skull bone is described as follows. The head of the animal is made fast in a stereotaxic device. The surface of the skull is laid bare completely, and the points where the electrodes are to be inserted are marked. At the marked locations, trepanation apertures are bored through with a trepan. The dura mater is pierced with a needle. In order to make support pins to hold the electrodes in place, nests are made in the skull bone near the trepanation apertures or around them in two or three places on the outer surface. The nests are drilled with two dental burrs. The drilling is carried out so as to maintain the lamina vitrea intact. Styracryl rolled into a little ball is pressed into the nest. After polymerization, the styracryl forms sturdy pins that can be joined into one ridge. The electrodes are inserted to the necessary depth and covered with mixed styracryl. The electrode and the first part of the lead soldered thereto are connected to the nearest support pin. P.V.E.

N64-31553* Naval School of Aviation Medicine, Pensacola, Fla.

LINEAR ENERGY TRANSFER SPECTRUM OF PROTON EXPOSURE ON MERCURY MISSION MA-9 **Report No. 28**

Hermann J. Schaefer 14 Jul. 1964 16 p refs
(NASA-Order R-75)
(NASA-CR-58948) OTS: $1.00 fs; $0.50 mf

The energy spectrum of astronaut proton exposure in the South Atlantic anomaly on Mercury mission MA-9 reported earlier is subjected to a detailed evaluation of the LET distribution of absorbed dose. It is found that the high LET fraction represents only a very small fraction of the total energy dissipation. Since this dose fraction requires, for the same amount of absorbed energy, a much smaller number of individual particles because of the high LET, a much larger emulsion volume has to be scanned for statistical significance. It is shown that this discrepancy in accuracy of total dose and high RBE dose is basic for all degraded continuous proton-energy spectra. The implications for the design of dosimetric instrumentation are discussed. Author

N64-31556 Joint Publications Research Service, Washington, D.C.

RESTORATIVE PROCESSES IN THE RADIATION INJURIES

M. A. Krayevskiy and A. V. Lebedinskiy, ed. 15 Oct. 1964 25 p refs Transl. into ENGLISH of 4 Excerpts from the book "Vosstanovitel'nyye Protsessy pri Radiatsionnykh Porazheniyakh" Moscow, Atomizdat, 1964 p 3-14, 89-95, 243-244 (JPRS-26921; TT-64-51177) OTS: $1.00

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1. MECHANISM OF RESTORATION AT THE CELLULAR LEVEL FOLLOWING RADIATION INJURIES N. V. Luchnik, N. A. Poryadkova, L. S. Tsarapkin, and N. V. Timofeyev-Resovskiy p 3-12 refs

2. RESTORATION OF IMMUNOGENESIS IN IRRADIATED ANIMALS N. N. Klemparskaya and G. A. Shal'nova p 13-19 refs

N64-31557* Joint Publications Research Service, Washington, D.C.

TENSION AND EXPULSION TIMES FOR THE CARDIAC SYSTOLE AS A FUNCTION OF FREQUENCY IN CARDIOVASCULAR-NORMAL MAN [IL TEMPO DI TENSIONE E DI ESPULSIONE DELLA SISTOLE CARDIACA IN FUNZIONE DELLA FREQUENCZA NELL'UOMO AD APPARATO CARDIOVASCULARE NORMALE]

F. Penati and O. Simeoni Nov. 1963 23 p refs Transl. into ENGLISH from Arch. Sci. Med. (Torino), v. 77, 1944 p 121–146

(NASA Order W-11577-B-114)

(NASA-TT-F-8567) OTS: $1.00 fs; $0.50 mf

Behavior of tension and expulsion values as a function of frequency variations under normal cardiovascular conditions was studied. The author followed closely the Blumberger method of the Eden school, and discusses several other methods. Simultaneous recordings of EKG (making only electrical recordings of the 3 simultaneous tracks), phonocardiogram, and carotid sphygmogram were made, and the cardiac cycle frequency for each track was determined. Data of frequency variations obtained by various doses of Atropin, and also by physiological rhythmic variations, were compared to normal data. By formulation of equations expressing the correspondence between rise or drop of frequency, respectively, to drop or rise in tension and expulsion intervals, a reciprocal linear relationship between tension and expulsion was deduced. G.G.

N64-31665 Naval Air Development Center, Johnsville, Pa. Aviation Medical Acceleration Lab.

DISPLACEMENT AND DURATIONAL CHARACTERISTICS OF LEVER PRESSING IN FIXED RATIO AND IN EXTINCTION

Robert M. Herrick 7 Jul. 1964 34 p refs *Its* Rept. No. 13 (NADC-ML-6407; AD-447394)

Considering lever presses of different displacements as different responses, some characteristics of FR5 behavior found were these: (1) variability comparable to that of extinction; (2) no "least effort" tendency; (3) no tendency to repeat reinforced responses; (4) a slight tendency to repeat nonreinforced responses; (5) a decrease in mean displacement as a function of the ordinal number of the press following reinforcement. There were no significant correlations between displacement distributions in acquisition and extinction. In extinction Ss tended to repeat successive responses. Median response durations and median interresponse times in extinction remained about the same as in acquisition, but extreme values occurred more frequently than in acquisition. Author

N64-31666 Naval Air Development Center, Johnsville, Pa. Aviation Medical Acceleration Lab.

SIMULATION AND EFFECTS OF SEVERE TURBULENCE ON JET AIRLINE PILOTS

Stuart Ragland, Jr., Randall M. Chambers, Richard J. Crosbie, and Lloyd Hitchcock, Jr. 13 Aug. 1964 53 p refs

(NADC-ML-6411; AD-448067)

The acceleration profile in the G_z axis of UAL 720-B, Flight 746, N7213U, which had encountered severe turbulence in the cirrus portion of a thunderstorm, was programed on the centrifuge. The aircraft had dived from 37 500 feet to 12 000 feet before being brought under control. The simulated turbulence produced accelerations that fluctuated from a maximum of $+3.5\ G_z$ to a maximum of $-2\ G_z$ at a random frequency average of 1 cps. The pilot and copilot who had flown the actual flight were the first to experience the centrifuge simulation. They pronounced it excellent. Effects upon pilot performance detrimental to safe control of the aircraft are thought to have been observed and recorded. On the basis of this limited pilot study, it appears that there is a consistent tendency to experience a kinesthetic illusion that causes the pilot to make inappropriate pitch control movements. Author

N64-31695 Ohio State U., Columbus Lab. of Aviation Psychology

RESEARCH ON DISPLAY VARIABLES Final Report

William C. Howell and Jerry D. Tate Griffiss AFB, N.Y., RADC, Aug. 1964 48 p refs

(Contract AF 30(602)-3066)

(RADC-TDR-64-266; AD-606637)

Three formal experiments were conducted on variables contributing to the accessibility, for human viewers, of information in large-scale displays. Major variables of interest were these: (1) duration of inspection; (2) amount of relevant and irrelevant information; (3) degree of irrelevancy; (4) kind of irrelevancy; (5) display format; and (6) excellence of event patterning. All results pointed toward two major conclusions: (1) The subject increases accessibility through organization, at a peripheral level, of relevant information. (2) Storage of display information involves two distinct processes—one more central and permanent, the other more peripheral and temporary. Implications for display design are discussed. Author

N64-31827 Lockheed-Georgia Co., Marietta Aerospace Medical Div. Aerospace Medical

COMBINED EFFECTS OF SLEEP LOSS AND DEMANDING WORK-REST SCHEDULES ON CREW PERFORMANCE

Earl A. Allisi, W. Dean Chiles (Aerospace Med. Div.), and Thomas J. Hall Wright-Patterson AFB, Ohio, AMRL, Jun. 1964 72 p refs

(Contract AF 33(657)-10506)

(AMRL-TDR-64-63; AD-606214)

Four 12-day confinement studies are reported. In each of two of these studies, subjects were organized into two 5-man crews who worked alternating shifts on a schedule of 4 hours on duty and 4 hours off for the entire 12-day confinement period. In each of the other two studies, six USAF pilots were confined for 12 days while following a schedule of 4 hours on duty and 2 hours off. During the middle two days of the 12-day confinement period, i.e., on days six and seven, the crews following the 4–4 work–rest schedule were assigned extra work that resulted in each man's remaining awake for a 44-hour period; on the same days, the crews following the 4–2 schedule were assigned extra work that resulted in each man's remaining awake for a 40-hour period. The data show that performance is generally inferior on the 4–2 schedule as compared to the 4–4 schedule and that the stress of a period of sleep loss results in generally greater performance decrements on the 4–2 than on the 4–4 schedule. Author

N64-31829 Washington U., Seattle

RECIRCULATION OF LYMPHOCYTES

N. B. Everett, Ruth W. Caffrey, and W. O. Rieke Jul. 1964 18 p refs

(Contract AF 41(657)-309)

(AAL-TDR-63-17; AD-606684)

The long-lived small lymphocyte population of the rat includes approximately 90% of the cells that appear in thoracic duct lymph. About two-thirds of the small lymphocytes in

blood are long lived. These long-lived cells are produced at a rate proportional to body growth and recirculate from blood to lymph. Although a major percentage of the small lymphocytes in lymph nodes and a smaller percentage of those in spleen are of the long-lived variety, the thymus may be their primary source of origin. The small lymphocytes in the bone marrow, approximately 95% of those in the thymus, and a major percentage of those in the spleen are short lived (five days or less). There is evidence that suggests the long-lived lymphocyte plays an active role in immune response mechanisms. Author

N64-31840 Joint Publications Research Service, Washington, D.C.
COMPARATIVE PHYSIOLOGICAL ACTIVITY OF GIBBERELLINS AND THE RELATION BETWEEN THE ACTIVITY AND STRUCTURE OF THE MOLECULE
G. S. Muromtsev 12 Oct. 1964 24 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 57, no. 3, 1964 p 447–492
(JPRS-26841; TT-64-51098) OTS: $1.00

The relation between physiological activity and chemical constitution of gibberellins and some of their derivates were studied. Gibberellins were isolated from fungus or plants and used as plant-growth regulators in order to interrupt dormancy; to stimulate growth; to develop acceleration; and to counteract, under certain conditions, external factors such as temperature or light. Diverse rearrangement of the basic molecular structure led to partial or complete inactivation of physiological activities. The presence of a lactone ring and of a free carboxyl group was found to be indispensible, and a methylen group was found to be essential. These characteristics were fulfilled in giberellin A_7, one of the most active compounds. G.G.

N64-31842 Air Force Systems Command, Wright-Patterson AFB, Ohio Aerospace Medical Div.
HEIGHT-WEIGHT SIZING OF PROTECTIVE GARMENTS, BASED ON JAPANESE AIR SELF-DEFENSE FORCE PILOT DATA, WITH FIT-TEST RESULTS
Milton Alexander, John T. Mc Conville, (Antioch Coll.), James H. Kramer, and Eugene A. Fritz Jul. 1964 39 p refs Prepared jointly with Antioch Coll.
(Contract AF 33(657)-9201; AF 33(616)-6792)
(AMRL-TDR-64-66; AD-606039)

The sizing program is based upon an anthropometric survey of over 200 subjects. The statistical rationale used in devising the height-weight program is presented, along with the analysis of the anthropometric data. Two garments, the CSU-7/P Partial Pressure Assembly and the CWU-13/P Exposure Garment, were fabricated in accordance with the developed sizing program. The results of the fit tests served to validate the soundness of the basic survey data and the subsequent development of the height-weight sizing program. Author

N64-31886 Naval School of Aviation Medicine, Pensacola, Fla.
THE INCIDENCE OF PHYSIOLOGICAL SYMPTOMS IN HEALTHY MEN AFTER EXPOSURE TO RAPID DECOMPRESSION TO 43,000 FEET SIMULATED ALTITUDE
Arthur L. Hall 1 Sep. 1963 11 p refs
(RR-3; AD-447851)

Quantitative differences in symptomatology were not conclusive. The types of symptoms noted in the young male subjects in order of occurrence and severity were: gastrointestinal gas pain, aeroembolism, and middle ear pain. Stay at terminal altitude of 43 000 feet had to be prematurely terminated in 16.5% of the runs because of the appearance of such symptoms. On the basis of such a high rate of premature descents necessary under the experimental conditions, it was concluded that there is a possible danger to pilots flying at such altitudes in fighter-type aircraft. Author

N64-31927 Air Force Systems Command, Wright-Patterson AFB, Ohio Flight Dynamics Lab.
CARBON DIOXIDE MANAGEMENT. PART I: TECHNIQUE FOR CARBON DIOXIDE ABSORBER EVALUATION
John P. Allen Jun. 1964 42 p refs
(FDL-TDR-64-67, Pt. I; AD-605287)

A laboratory device was assembled for a closed air loop analysis of carbon dioxide removal agents. Lithium hydroxide, potassium hydroxide, soda lime, and molecular sieve 5A were used for establishing the adaptability and capability of this device for evaluation of other carbon dioxide removal agents. Carbon dioxide absorption curves from 1% and/or 5% carbon dioxide in laboratory air were obtained. Borax solution and amine solutions or solids showed some carbon dioxide removal capacity. Author

N64-31934 Utah U., Salt Lake City. Coll. of Medicine
EFFECT OF COLD EXPOSURE ON THE FORMED ELEMENTS OF MOUSE PERIPHERAL BLOOD
S. Marcus and F. Miya Ft. Wainwright, Alaska, Arctic Aeromed. Lab., Jun. 1964 27 p refs
(Contract AF 41(657)-311)
(AAL-TDR-63-23; AD-605258)

A search was made for a hematological parameter that might indicate when acclimatization to cold occurred in mice. The formed elements of mouse peripheral blood tested were total white blood cells and the absolute numbers of polymorphonuclear leucocytes, monocytes, lymphocytes, stress lymphocytes, and eosinophils. In addition the hematocrit, body weights, and adrenal gland weights were measured. No consistent changes between 21° and 2° C caged mice were observed with respect to the total WBC, PMN, stress lymphocytes, lymphocytes, and monocytes. Author

N64-31935 New Hampshire U., Durham
THE INFLUENCE OF HIBERNATION UPON EXPERIMENTAL INFECTIONS IN THE ALASKAN GROUND SQUIRREL
T. G. Metcalf and J. P. Schmidt Ft. Wainwright, Alaska, Arctic Aeromed. Lab., Dec. 1963 8 p refs
(Contract AF 41(609)-1856)
(AAL-TDR-63-25; AD-605254)

Coxsackie virus infection occurred in both active and hibernating states by extension of virus into the tissues of ground squirrels following oral administration of virus. Virus was eliminated rapidly by the active animals but retained in tissue depots of hibernating animals for a lengthy period of time. The findings pose a question of whether the Alaskan ground squirrel could serve as a reservoir for the maintenance of microbiological forms of life in Arctic areas. Author

N64-31936 Aerospace Medical Div. Arctic Aeromedical Lab., Fort Wainwright, Alaska
NATURAL MAMMALIAN HIBERNATION A Bibliography
William V. Mayer Jun. 1964 300 p
(Contract AF 41(657)-230)
(AAL-TDR-63-34; AD-605252)

N64-31942 Chicago Medical School, Ill.
EFFECTS OF WHOLE-BODY VIBRATIONS ON PLASMA AND URINARY CORTICOSTEROID LEVELS IN MAN Technical Documentary Report, Dec. 1960–Feb. 1963
Ben B. Blivaiss, Edward B. Magid, and Renato Litta-Modignani Wright-Patterson AFB, Ohio, Aerospace Med. Res. Labs., Jun. 1964 17 p refs
(Contract AF 33(616)-6889)
(AMRL-TDR-64-53; AD-606034) OTS: $0.50

The effects on the hypophysio-adrenal and hypophysio-thyroid systems of whole-body vibration of the human for three 3-minute exposures separated by 1 1/2-minute rest periods at 1 to 20 cps were assessed through the determination of plasma 17-hydroxycorticosteroids (17-OH-CS) and protein-bound iodine (PBI) and of urinary adrenal cortex steroids. The levels of vibration were estimated three-minute tolerance values for the various frequencies. Blood and urine samples were collected at corresponding times on the control day and on the experiment day. Plasma 17-OH-CS levels were lower than control values ($P < 0.05$) immediately after vibration at 5, 6, and 7 cps and at 5 hours after vibration ($P < 0.01$). There was a significant decrease in the urine excretion of the blue tetrazolium reducing steroids at 1, 2, and 3 cps, and in 17-ketogenic steroids at 18, 19, and 20 cps. At 5, 6, and 7 cps there were significant changes in all steroids studied. Author

N64-31943 Chicago Medical School, Ill.
ENDOCRINE AND METABOLIC RESPONSE OF DOGS TO WHOLE-BODY VIBRATION Technical Documentary Report, Dec. 1959–Feb. 1963
Ben B. Blivaiss, Renato Litta-Modignani, Giorgio Galansino, and Piero P. Foa Wright-Patterson AFB, Ohio, Aerospace Med. Res. Labs., Jun. 1964 19 p refs
(Contract AF 33(616)-6889)
(AMRL-TDR-64-54; AD-606054) OTS: $0.50

To determine the endocrine and metabolic response of restrained dogs to whole-body vibration, pentobarbital-anesthetized and nonanesthetized dogs were vibrated along the z axis while restrained in dorsal recumbency. After vibration of anesthetized dogs at either 4 cps and 0.4 g for 30 minutes or 2 hours, or at 10 cps and 2.3 g for 2 hours, there was an average increase of 4.08 mcg of 17 hydroxycorticosteroids (17-OH-CS) per 100 ml plasma and a significant increase in blood epinephrine, but not in serotonin or norepinephrine. Shaking at 4 cps and 1.7 g for 30 minutes produced less of a change in plasma 17-OH-CS than at 0.4 g. However, shaking at 4 cps for 6 hours led to greater increase in plasma 17-OH-CS at 1.7 g than at 0.4 g. Nonanesthetized dogs shaken at 4 cps for 30 minutes had a greater increase of plasma 17-OH-CS than similarly shaken anesthetized dogs. Author

N64-31944 Republic Aviation Corp., Farmingdale, N.Y.
SPECIFICATION OF OPTIMUM FAULT ISOLATION PRESENTATION Technical Documentary Report, Mar. 1963–Mar. 1964
W. R. Atchley, J. Ver Hulst, and D. J. Lehr Wright-Patterson AFB, Ohio, AMRL, Jun. 1964 87 p refs
(Contract AF 33(657)-10834)
(AMRL-TDR-64-57; AD-606215)

This report describes the development of a System Analysis Model (SAM), utilizing equipment characteristics and maintenance environments of Air Force equipments, which provides a guide for technical writers in the selection of the most efficient fault isolation presentations for current and R&D systems. From this model, three characteristics that affect the efficiency of fault isolation presentation formats were selected for experimental manipulation and evaluation. These characteristics (type of circuitry, type of indicators, and system complexity) were used to evaluate the relative efficiency, in terms of performance accuracy and time, of three fault isolation presentation formats—standard schematics, data flow diagrams, and proceduralized instructions. Their nonsignificant differences suggest that the criterion for choosing between standard schematics and data flow diagrams would be the cost of development when dealing with equipments with similar characteristics. Proceduralized instructions were found to be more efficient than the other two formats. Author

N64-31979 Aerospace Corp., El Segundo, Calif. Applied Mechanics Div.
THE EVALUATION AND APPLICATION OF CHEMICALLY REGENERATIVE ATMOSPHERIC CONTROL SYSTEMS
John W. Smylie 1 Jun. 1964 119 p refs
(Contract AF 04(695)-269)
(SSD-TDR-64-95; TDR-269(4560-50)-2; AD-604415)

This report presents a survey and analysis of carbon dioxide reduction, atmospheric regeneration systems. Emphasis was placed on inorganic chemical systems on the basis of availability, weight and power requirements, and compatibility with space vehicle design. The two most promising systems, methanization and carbonization (both utilizing hydrogen reduction of carbon dioxide into water and subsequent electrolysis of the water), were analyzed in detail and compared with other inorganic regeneration, biological, and open cycle systems. Both systems were evaluated, with major emphasis given to the interaction between the complete vehicle design and the carbon dioxide removal and oxygen supply systems. A set of penalty curves were derived showing the effects on takeoff weight of changes in the power penalty, leakage rate, water-recovery system efficiency, and use of byproducts from the carbon dioxide regeneration system. Author

N64-32016 Argentina Comision Nacional de Energia Atomica, Buenos Aires
THIN LAYER CHROMATOGRAPHIC SEPARATION OF VITAMIN D AND RELATED SUBSTANCES [SEPARACION CROMATOGRAFICA EN CAPA DELGADA DE VITAMINA D Y SUSTANCIAS RELACIONADAS]
A. E. A. Mitta, A. Troparevsky, and M. L. P. de Troparevsky 1964 7 p refs In SPANISH Presented at 8th Cong. Latinoam. De Quim., Buenos Aires, 1962 *Its* Informe No. 123

The separation by thin layer chromatography of mixtures of vitamin D, cholesterol, and products from the irradiation of the vitamin D precursors was studied. The results obtained indicate the possibility of securing a good separation of all the tested substances, with the exception of vitamins D_2 and D_3. All the solvents tried present practically the same R_f values. A quantitative evaluation of the D vitamins and of the cholesterol indicates, respectively, a recovery of 90% to 92% and 85% to 90%, which offers a good prospect for their quantitative determination in mixtures. Experimental procedures are described, and the data obtained are presented in a table.
Trans. by D.E.W.

N64-32018* Technisch Documentatie en Informatie Centrum Voor de Krijgsmacht, The Hague (Netherlands)
PROTECTION AGAINST THE BIOLOGICAL EFFECTS OF THERMAL RADIATION—A BIBLIOGRAPHY
J. W. Thiessen and J. Van Woerden Feb. 1963 105 p refs
(TDCK-33500)

This bibliography contains summaries of reports and articles on the physical characteristics of thermal radiation and radiation sources, on exposure, environmental, and skin factors influencing cutaneous burn production, and on the protective effects of fabrics, paints, creams, and other interposed materials. Material on mathematical analyses (prediction techniques) and retinal lesions is included. Whenever possible an annotation accompanies each bibliographical entry. The bibliography consists of 171 entries. Author

N64-32026 Aerospace Medical Div. Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
THE REFRACTIVE ERROR AND INTRAOCULAR PRESSURE OF IMMATURE CHIMPANZEES UNDER SERNYL ANESTHESIA
Francis A. Young (Wash. State Univ., Pullman) and Donald N. Farrer Aug. 1964 10 p refs
(ARL-TDR-64-9; AD-445731)

Fifty chimpanzees, 29 males and 21 females ranging in age from 2 years old to 9 years old were refracted in the supine position under Sernyl anesthesia and Cyclogyl Cycloplegia. Intraocular pressures were obtained under the same conditions, and the results are summarized according to age, eye, and sex. Author

N64-32031 School of Aerospace Medicine, Brooks AFB, Tex.
RADIOPROTECTION WITH AET-CYSTEINE IN THE RHESUS MONKEY
George S. Melville, Jr., George V. Harrison, Jr., and Thomas P. Leffingwell Aug. 1964 13 p refs
(SAM-TDR-64-40; AD-448072)

A combination of radioprotective drugs, aminoethylisothiuronium dibromide (AET) and *l*-cysteine, was administered to *Macaca mulatta* monkeys before they received either 588 rad or 672 rad of X-radiation. Significant protection against mortality was observed at 588 rad for animals given AET-cysteine intravenously and for animals given AET-cysteine orally in conjunction with a sedative and postirradiation therapy. Protection was also observed at 672 rad for animals given both AET-cysteine intravenously and postirradiation therapy. Few differences in peripheral hematology were noted; however, changes in body weight and rectal temperature were less pronounced in treated animals at 588 rad than in untreated irradiated animals. Author

N64-32037 Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
RESPONSE AND FEEDBACK TECHNIQUES FOR AUTOMATED TRAINING OF VISUAL IDENTIFICATION SKILLS
Alexander Z. Weisz and Linda S. Mc Elroy Jul. 1964 32 p refs
(Contract N61339-789)
(NAVTRADEVCEN-789-3; AD-447882)

A small-scale study investigated the extent to which results in favor of covert response techniques over confirmation procedures, found for paired-associate materials and identification of nonverbal sounds, apply to visual identification tasks. Three overt response procedures differing in the time at the number of tries permitted, were compared with two prompting procedures requiring no overt response. The learning task involved discriminating among three values for each of four dimensions of variation of unfamiliar forms. Differences in performance between prompting and confirmation groups were not significant. The best procedure was one in which immediate feedback, cueing, and a simplified display of feedback information were combined. Author

N64-32048* Brandeis U., Waltham, Mass.
THE COMPARATIVE ENZYMOLOGY OF TRIOSEPHOSPHATE DEHYROGENASE
William S. Allison (Cambridge U.) and Nathan O. Kaplan Repr. from J. Biol. Chem., v. 239, no. 7, Jul. 1964 p 2140–2152 refs *Its* Publ. no. 287,
(Grants NsG2375; NSF-G-14612; NIH CA-03611; AM. Cancer Soc. G-P-77F)

Procedures are described for the preparation of crystalline triosephosphate dehydrogenases from human heart muscle, beef, chicken, turkey, pheasant, halibut, and sturgeon skeletal muscle, and lobster tail muscle, as well as the procedure for a homogeneous preparation of triosephosphate dehydrogenase from *Escherichia coli*. The sedimentation constants of triosephosphate dehydrogenases isolated from 11 different species have been determined in 0.10_M sodium phosphate, pH 7.0. The electrophoretic properties of triosephosphate dehydrogenases isolated from 10 species have been compared on starch gels. The amino acid compositions of 11 triosephosphate dehydrogenases and their catalytic properties have been determined. The muscle enzymes crystallize with varying amounts of firmly bound diphosphopyridine nucleotide. Immunological cross reactions between rabbit antisera prepared against turkey, halibut, sturgeon, and lobster triosephosphate dehydrogenases and the homogeneous triosephosphate dehydrogenase from other species have been determined by quantitative complement fixation. Author

N64-32066 Federal Aviation Agency, Oklahoma City, Okla. Aeromedical Research Div.
STUDIES ON AIR LOADS ON MAN
John J. Swearingen and Ernest B. Mc Fadden [1954] 9 p refs
(AD-602207) OTS: $1.00

Data obtained in three different studies related to measurement of forces on the body due to air movement are summarized. The effects of short-duration blast forces on personnel seated or standing at various distances from openings during pressure loss, blast forces necessary to disorient the body from numerous positions, effect of clothing on the drag forces, and measurements of forces and moments on the body during wind-tunnel tests are discussed and compared. Author

N64-32074 Rochester U., N.Y. Div. of Radiation Chemistry and Toxicology
ON THE POSSIBLE ROLE OF CRYSTALS IN THE ORIGIN OF LIFE
W. F. Neuman and M. W. Neuman 7 Aug. 1964 48 p refs
(Contracts W-7401-ENG-49; AT(30-1)-3287)
(UR-656)

It is postulated that two crystalline lattices, the silicates and the apatites, have the properties of surface adsorption and surface catalysis, which may have permitted them to play an important role in the origin of life on earth. In particular, they might concentrate monomers of biological interest, amino acids and nucleosides, and catalyzed dehydration reactions leading to phosphorylations and polymer formation. It was possible to show that apatite adsorbs a wide variety of monomers. Further, apatite was shown to function as a crude kind of chlorophyll, converting radiant energy, heat, or infrared irradiation to high-energy phosphate bonds in good yield. Adenosine was shown to be phosphorylated in the 5 position to AMP, and the process could be continued to the production of biologically active ATP. Chromatographic evidence was obtained, strongly suggesting that oligonucleotides were also produced. The significance of the results is discussed. Author

N64-32102 Arctic Health Research Center, Anchorage, Alaska

A METHOD OF DETERMINING THE POLLUTION OF SURFACE WATERS BY THE EGGS OF *ECHINOCOCCUS*

D. J. Baumgartner Ft. Wainwright, Alaska, Arctic Aeromed. Lab., Jul. 1964 8 p refs

(AAL-TDR-63-37; AD-606882)

A continuous upward flow sedimentation unit was developed to test surface waters at remote radar stations in Alaska for the presence of eggs of *Echinococcus*. Chlorination employed at these water supplies is not an effective protection. Many animals in these areas are infected with the tapeworm, and man can serve as a host for the larval form. Diagnoses of echinococcosis in the native population caused concern for health of Air Force personnel. Lack of early disease symptoms and unreliability of clinical tests necessitate physical surveillance of water supplies. Laboratory tests validated methodology. Author

N64-32115 Arctic Health Research Center, Anchorage, Alaska

TREATMENT OF UNDILUTED HUMAN WASTE BY THE ACTIVATED SLUDGE PROCESS

D. J. Baumgartner and C. F. Walters Ft. Wainwright, Alaska, Arctic Aeromed. Lab., Mar. 1964 23 p refs

(AAL-TDR-63-36; AD-605257)

A laboratory-activated sludge system was operated to confirm field investigations indicating that a 423-gallon recirculating activated sludge system could adequately treat the undiluted human wastes from 10 men for at least six months and provide an effluent acceptable for use as a flushing fluid. In addition, the level and the effects of overloading were noted. The effect of high pH on odor production was observed, and the importance of pH control between 6 and 7 was demonstrated. The feed COD of 44 000 mg/l (BOD = 21 000 mg/l) was reduced by about 90% and the estimated water savings for toilet flushing was estimated at greater than 90%. Author

N64-32144 Illinois U., Urbana

EXPERIMENTAL KETOSIS IN MAN—"COLD KETOSIS" COMPARED WITH POST-EXERCISE KETOSIS AND NUTRITIONAL KETOSIS Annual Progress Report

Robert E. Johnson and D. Phil 15 Oct. 1963 93 p refs

(Contract DA-49-193-MD-2222)

(APR-2; AD-422388)

This investigation was designed to answer three questions: (1) Does repetition of a ketosis following a 10-mile walk cause adaptive responses? (2) Does repeated exposure to cold result in a diminished ketotic response? (3) Do women show a post-exercise ketosis like men? Men and women both displayed a decreasing ketotic response as a result of repetitive exposure to exercise; and one out of four men showed a similar phenomenon with respect to adaptation to cold. Women displayed a postexercise ketosis similar to that shown by men, despite much individual variability. Prolonged moderate exercise, exposure to cold and starvation all produce similar metabolic effects. Author

N64-32154 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio

AN EXPERIMENTAL INVESTIGATION UNDER ZERO-GRAVITY CONDITIONS OF TETHERED WORKER MAINTENANCE TECHNIQUES

Fred Henry Ernst and Roy Benjamin Smith (M.S. Thesis) Aug. 1963 104 p refs

(GA-63; AD-419776)

Three major tasks are involved: (1) devising and fabricating tethering devices and test apparatus; (2) testing the tethering devices under conditions that simulated, as closely as possible, the conditions the maintenance man will encounter in space; and (3) analyzing all test results to assure that any proposed tethering device did, in fact, provide the required capability. Of the 10 tethering devices tested, the device meeting all criteria was one that consisted of direct attachment through eyebolts and clamps between the worker's toes and the work area, and attachment through adjustable length straps between the worker's waist and the work area. The applicability of the other tethering devices was also determined. Author

N64-32163 Joint Publications Research Service, Washington, D.C.

HUMAN BIOCHEMICAL GENETICS

H. G. Hers 28 Sep. 1964 32 p Transl. into ENGLISH from Rev. Questions Sci. (Louvain), v. 24, 20 Jul. 1963 p 343-366

(JPRS-26577; TT-64-41835) OTS: $2.00

Ideas are reviewed that have emerged from genetic-biochemical research; their application to human medicine is stressed. Topics covered include the localization of man's genetic potential, the chemical nature and function of the gene, gene mutation, biochemical interpretation of recessiveness and dominance, sex-linked heredity, regulatory genes and operons, gene duplication, and the biochemistry of evolution. R.L.K.

N64-32164 Joint Publications Research Service, Washington, D.C.

BIOLOGICAL AND MEDICAL PROBLEMS RELATED TO THE DEVELOPMENT OF CHEMISTRY

V. Kh. Vasilenko and M. A. Zhukovskiy 12 Oct. 1964 12 p Transl. into ENGLISH from Klin. Med. (Moscow), v. 42, no. 6, 1964 p 3-8

(JPRS-26845; TT-64-51102) OTS: $1.00

A summary of the papers presented at the general meeting of the Academy of Medical Sciences U.S.S.R. (Feb. 3-7, 1964) is presented. The meeting was concerned with the utilization of the achievements of chemistry in the field of medicine. P.V.E.

N64-32165 Joint Publications Research Service, Washington, D.C.

THE CHEMICAL COMPOSITION OF THE UREA-EXTRACTABLE COMPONENTS OF THE PLAGUE VIRUS EV

L. S. Olenicheva 12 Oct. 1964 10 p refs Transl. into ENGLISH from Ukr. Biokhim. Zh. (Kiev), v. 36, no. 4, 1964 p 492-497

(JPRS-26858; TT-64-51115) OTS: $1.00

The use of urea to extract water-insoluble residue from the plague microbe EV is discussed. It was found that a 2.5 M solution of urea is a more active extractant for removing antigens from the water-insoluble residual of plague bacteria EV than is a 2.5% solution of sodium chloride. The qualitative chemical composition of ureic and salt extracts is similar, but in the ureic extracts there is a greater hydrocarbon content. The extracts that were studied represented a multicomponent system. Their basic mass consisted of simple and complex proteins - glycoproteids and nucleoproteids. P.V.E.

N64-32208 Cornell Aeronautical Lab., Inc., Buffalo, N.Y.
THE EFFECTS OF VIBRATION ON DIAL READING PERFORMANCE Technical Documentary Report, May 1963–Feb. 1964
Harvey A. Taub Wright-Patterson AFB, Ohio, Aerospace Med. Res. Labs., Jul. 1964 27 p refs
(Contract AF 33(657)-11729)
(VH-1838-E-1; AMRL-TDR-64-70; AD-603963)

Four experiments were performed to determine the effects of whole-body sinusoidal vibrations in the X-, Y-, and Z-axes upon dial-reading performance. The subjects were in the semi-supine position so that the force of gravity was directed through the X-axis of the body. In all four experiments, performance of 6, 11, and 15 cps was compared at various levels of acceleration with and without the use of a helmet restraint. Further, performance was assessed with an easy and a difficult dial reading task. The results indicated that performance with the easy task was relatively unaffected by the vibration conditions, whereas large and significant losses in performance occurred with the difficult task. Mean errors for the difficult dial reading task increased significantly as the acceleration level of vibration increased. The results further indicated that the effects of helmet restraint and frequency upon performance with the difficult reading task varied with the direction of vibration. Author

N64-32223* Aerospace Medical Div. Aerospace Medical Research Lab. (6570th), Wright-Patterson AFB, Ohio
PROTEIN-BOUND IODINE IN SERUM OF RATS BREATHING 99 PERCENT OXYGEN
Philip Felig, J. K. Goldman, and W. L. Lee, Jr. Repr. from Sci., v. 145, no. 3632, 7 Aug. 1964 p 601–602 refs
(NASA Order R-87)

Exposure of rats to 99% oxygen for 24 to 72 hr resulted in a significant fall in protein-bound iodine in serum. The fall was most prominent in the group treated for 72 hr and was not, however, associated with any detectable microscopic changes in thyroid structure. Author

N64-32225* Maryland U., Baltimore School of Pharmacy
THE COMPARATIVE BIOCHEMISTRY OF DEVELOPING *ASCARIS* EGGS. V: CHANGES IN CATALASE ACTIVITY DURING EMBRYONATION
L. C. Costello and W. Smith Repr. from Arch. Biochem. Biophys., v. 106, Jul. 1964 p 223–228 refs
(Grants NsG-436; NSFG-23313; PHS-G-DT-46)

Catalase activity was identified in homogenates of eggs of Ascaris lumbricoides varosuum. The specific activity of catalase (μmoles H_2O_2 decomposed per minute per milligram protein) was 30, 16, and 54 in the 1-cell first-stage larval, and second-stage larval eggs, respectively. The initial catalase activity observed in fertilized unembryonated eggs (1-cell) remained constant through cleavage and gastrulation until velopment of the first-stage larve, at which time activity markedly decreased (50%). When first-stage larvae molted to second-stage larvae, an immediate and marked increase (over 300%) in activity resulted. The relationship of catalase, cytochrome oxidase, and respiration in embryonating eggs is discussed. Catalase activity through all stages of embryonation was in great excess of theoretically formed H_2O_2, apparently serving as a protective mechanism against perioxide toxicity. Author

N64-32236 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
MEDICAL INVESTIGATIONS IN EASTERN ANTARCTIC
N. R. Paleyev 24 Jul. 1964 11 p Transl. into ENGLISH from Pervaya Kontinental'naya Ekspeditsya, 1955–1957, Nauchnye Rezul'taty (USSR) p 157–162
(FTD-TT-64-291/1; AD-605470)

Medical observations and measurements obtained on personnel at bases in the Antarctic and on ships in the area are discussed. The measurements were taken in an attempt to investigate the following problems: (1) Does the human organism experience any changes under conditions of long-term work in the Antarctic and, if so, what kinds of changes? (2) Are such changes dangerous to normal vitality of the organism? (3) What factors cause the changes? (4) How rapidly do these changes develop and how long are they preserved after leaving the Antarctic? P.V.E.

N64-32295 Kaiser Foundation Research Inst., Richmond, Calif. Lab. of Comparative Biology
STUDY OF PIGMENT SYSTEMS OF PHOTOSYNTHETIC ORGANISMS Final Report
Mary Belle Allen 28 Apr. 1964 6 p refs
(Contract AF 19(604)-6636)
(AD-602394)

A summary of work carried out in studying pigment systems of photosynthetic organisms is presented. Conclusions and results presented included the following: (1) The resolution of absorption spectra of cell suspensions is not improved by diffusers, such as opal glass, if a spectrophotometer receiving a large cone of light is used. (2) Electron spin resonance measurements on illuminated cells of *Chlorella pyrenoidosa* have shown the presence of two types of signal—a sharp, rapidly decaying one at g = 2.0030, and a broad (resolvable into five lines), slowly decaying one at g = 2.0046, with a line spacing of 5.5 gauss. (3) In *Chlorella pyrenoidosa* simultaneous illumination of the cells with light of two different wavelengths, absorbed by different pigment systems, results in a signal intensity that is less than the sum of the signals induced by the two light beams acting independently. (4) Work on the separation of the chlorophyll complexes of *Chlorella pyrenoidosa* has led to the isolation of a fraction with absorption maximum at 672 mμ, in contrast to the 678 to 680 mμ of the intact cell. P.V.E.

N64-32299 Naval Medical Research Lab., New London, Conn.
CRITICAL VISUAL AREAS OF EXPLOSIVE-ACTUATED LENS FILTER (ELF) SYSTEM FOR PREVENTION OF FLASH BLINDNESS
Kevin V. Laxar 15 Jan. 1964 9 p refs
(MR-64-1; AD-442740)

The adequacy of the field of view provided by the ELF helmet and visor system for scan of the instrument panel in operational Naval aircraft is discussed. The ELF helmet and visor system provides a visual field adequate for scan of critical instruments in the A-4 aircraft. Author

N64-32306 Joint Publications Research Service, Washington, D.C.
RADIATION PROTECTING ACTION OF CYANOGEN COMPOUNDS
V. D. Rogozkin, V. P. Belousov, and N. K. Yevseyeva 13 Oct. 1964 77 p Transl. into ENGLISH from the book "Radiozashchitnoye Deystviye Tsianistykh Soyedineniy", State Publishing House of Medical Literature Moscow, 1963 p 3–5, 7–23, 66–117
(JPRS-26887; TT-64-51144) OTS: $3.00

Discussed are investigations carried out to find agents that when given orally, would have a prophylactic effect in the

case of acute radiation sickness, and at the same time, would not disturb the general condition of the organism and would not have unfavorable side effects. The following areas of the investigation are discussed: (1) compilation of brief data from literature on the use of cyanides and nitriles in severe radiation illness; (2) the results of preliminary research on the selection of protective preparations from the group of cyanophor compounds; (3) the protective action of amygdalin in severe radiation illness; (4) the effectiveness of amygdalin in severe radiation illness as compared to other radiation protective agents; and (5) aspects of the mechanism of action of amygdalin as a radiation protective agent. It was found that amygdalin has the most favorable effects among many known prophylactic agents, and that amygdalin provides a radiation-protecting action, when given orally long before irradiation, and possesses a broad therapeutic range. P.V.E.

N64-32308 Atomic Energy of Canada Ltd., Chalk River, Ontario
ANALYSIS OF EXTERNAL RADIATION EXPOSURES IN 1963
G. Cowper and P. C. Rowe May 1964 11 p refs
(ACEL-2050) Available from Sci. Doc. Distrib. Office, Chalk River: $0.50

An analysis of occupational radiation exposures received by employees has been carried out by machine accounting methods. Results are presented in tables and graphs. Author

N64-32324 System Development Corp., Santa Monica, Calif.
COMPUTER APPLICATIONS IN MEDICINE AND THE BIOLOGICAL SCIENCES Bibliography II
Sally L. Empey 28 Oct. 1963 36 p refs
(SP-1025/001/00)

N64-32326 Deutsche Versuchsanstalt für Luft- und Raumfahrt, Bad Godesberg (W. Germany) Inst. für Flugmedizin
THE INFLUENCE OF SHORT-TERM OXYGEN DEFICIENCY ON THE "ALKALI RESERVE" [DER EINFLUSS KURZFRISTIGEN SAUERSTOFFMANGELS AUF DIE "ALKALIRESERVE"]
Heinz Kunzmann Porz, DVL, May 1964 51 p refs In GERMAN; ENGLISH summary
(DVL-225) Available from Vereinigte Universitäts- u. Fachbuchhandlungen, R.-Wagner-Str. 1, Cologne, W. Germany

This article covers the evaluation of 34 short-term oxygen deficiency tests with regard to the changes in pH values, bicarbonate contents, and the carbonic-acid partial pressure of the human blood. Hyperventilation alkalosis and reduced carbonic-acid partial pressure were found in all persons, and an increased bicarbonate content was determined in 26.5% of test subjects, leading to the conclusion that some of the changes can be attributed to metabolic disturbances. G.G.

N64-32347 Deutsche Versuchsanstalt für Luft- und Raumfahrt, Bad Godesberg (W. Germany) Institut für Flugmedizin
THE BIOLOGICAL EFFECT OF HIGH BLAST-FREE PRESSURE Report No. 1 [DIE BIOLOGISCHE WIRKUNG HOHER STOSSFREIER DRUCKBELASTUNG I. Bericht]
O. Wunsche Jul. 1964 27 p refs In GERMAN; ENGLISH summary Prepared in cooperation with Deutsch-Französisches Forschungsinstitut St. Louis
(DVL-359; DLR-FB-64-06)

The possible death of living beings exposed to an air blast depends not only on the maximum pressure and impulse of the impacting wave but also on other factors of the pressure profile. Under slowly increasing pressures over a time of about 0.5 sec until the maximum pressure, stresses are tolerated that are nearly 10 times higher than those under fatal pressure blast. Starting from the biological effects of the pressure blast, this report presents experiments on albino rats that should determine the tolerance of high blast-free pressures up to 46 atm. The times of exposure on the highest pressure level were varied between 2 and 40 sec. The times of increasing and of decreasing pressure were kept constant. Author

N64-32350* Minnesota U., Minneapolis
PERIODICITY ANALYSIS: A POTENTIAL TOOL FOR BIOMETEOROLOGISTS
F. Halberg Repr. from Int. J. Biometeor., v. 7, Issue 2, 1963 p 167-191 refs
(Grants NsG-517; PHS-G-C-4359; PHS-G-NB-04531; Am. Cancer Soc. G-E-155)

In the study of physiological variations, the homeostatical approach leads to the treatment of the variations as random processes, and has the drawbacks of reliance on gross deviations for a description of the normal function, and of nondetection of physiopathological changes if the values are within normal range. Periodicity analysis uses normal rhythms rather than normal ranges as the reference standard. The methodology of periodicity analysis is presented for biometeorologists' evaluation of a physiological time series in which a broad spectrum of rhythms and near-rhythms are recognized and analyzed. The circadian component of variation is the most prominant; external and internal timing, synchronization, phase differences, and phase shifts in circadian systems are discussed in detail. D.S.G.

N64-32355 Library of Congress, Washington, D.C. Aerospace Technology Div.
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS. PART A: BIOSCIENCES Compilation of Abstracts
1 Sep. 1964 29 p refs
(ATD-P-64-52; AD-605550) OTS: $2.00 fs; $0.50 mf

Items selected from Soviet open literature and dealing with the following topics are discussed: (1) Space Medicine and Biology—"Decrease of the Effectiveness of the Protective Action of Cysteamine in Repeated Irradiation"; "Study of the Antiradiation Effect of Phenoxazine Derivatives"; "Effect of Prophylactic on Animals Subjected to External or Internal Irradiation"; "New Trends in the Study of Regeneration"; "Action Mechanism of Prophylactic and Therapeutic Complexes in Rats with Acute Radiation Sickness"; "Stimulating Effect of Serotonin on Hematopoiesis in Irradiated Rats"; and "Progress in Soviet Reanimatology"; and (2) Space Physiology—"The Effect of Decompression in Acute and Chronic Experiments"; "Effect of Hypoxia on the Coronary Circulation of Dogs"; "Effect of Proton and Gamma Radiation on the Functional State of the Vestibular Analyzer"; "On Mount Aragats"; and "Bioelectric Activity of Skeletal Muscles under Alternating Conditions of Overloads and Weightlessness. P.V.E.

N64-32356 Library of Congress, Washington, D.C. Aerospace Technology Div.
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS. PART A: BIOSCIENCES Compilation of Abstracts
2 Sep. 1964 29 p refs
(ATD-P-64-53; AD-605415) OTS: $1.00 fs; $0.50 mf

The abstracts are of papers selected from Soviet literature. Articles dealing with the following subjects are included: (1) Space Medicine and Biology—"Mechanism of the Antiradiation Effect of Cysteamine"; "Autoinfection (intestinal) in Radiation Sickness and Its Prevention in White Rats of the Wistar Strain";

"Radioprotective Effect of Diethylstilbestrol"; "Dynamic Biotelemetry"; and (2) "Space Physiology—Effect of Chemical Radioprotectors on Free Oxygen Concentration in the Brain and Bone Marrow of Rabbits"; "Content of the Catechol Hormones, Adrenaline and Noradrenaline, in Peripheral Blood during Moderate Hypothermia"; "Weightlessness and Artificial Gravity"; "Third Volga-Area Conference of Physiologists, Biochemists, and Pharmacologists"; and "Studies of Chemical Protection against Ionizing Radiation. I. Studies of the Toxicity of Sodium Cysteine Thiosulfonate to C_{57} Strain Black Mice."
P.V.E.

N64-32375 Naval School of Aviation Medicine, Pensacola, Fla.
CUMULATIVE EFFECTS OF REPEATED EXPOSURE TO HIGH-INTENSITY TONES UPON RECOVERY OF AUDITORY SENSITIVITY
Vernon C. Bragg 4 Aug. 1963 14 p refs
(AD-420856)

An investigation was designed to study the progress of measurable accumulation in the time required to recover auditory sensitivity as such accumulation develops following successive exposure to tonal stimulation at various intensities. The results were considered as they relate to the physiology of hearing and the possibility of testing for noise susceptibility. Two major conclusions emerged from the findings of this study: First, the pattern of recovery time curves appears to confirm the concept of a critical intensity. Specifically, under the conditions of the study, it appears that a different mechanism of cumulation is responsible for the responses to exposures in excess of 95 dB than for those below this critical level. It is concluded that 95 dB represents a critical intensity below which adaptation is evoked and above which cumulative fatigue is effected. Second, it was concluded that only those responses which resulting from exposures in excess of the critical intensity showed promise for use in a test of noise susceptibility.
Author

N64-32376 Electro-Voice, Inc., Buchanan, Mich.
[COMFORT PROBLEMS IN SPACE ENVIRONMENTS—SPACECRAFT NOISE] Status Report No. 1
[1964] 6 p
(Contract AF 33(615)-1295)
(AD-442827)

Progress is reported on a project to reduce the acoustic noise in the Gemini capsule to a tolerable level. The acoustic noise facility was being activated, helmets and artificial heads were being procured, and various meetings and conferences were held.
D.E.W.

N64-32377 Electro-Voice, Inc., Buchanan, Mich.
[COMFORT PROBLEMS IN SPACE ENVIRONMENTS—COMMUNICATION EQUIPMENT NOISE] Status Report No. 2
[1964] 11 p refs
(Contract AF 33(615)-1295)
(AD-442828)

The comparison of types of earphones and microphones was begun, and a survey of standard military and commercial earphones is summarized. Noise spectra in Mercury-type capsules are presented, and effects of various helmets and helmet designs on noise level are discussed.
D.E.W.

N64-32379 Miami U., Coral Gables, Fla. Bascom Palmer Eye Inst.
HUMAN ELECTRORETINOGRAPHY AS A GAUGE OF VISUAL PERFORMANCE Annual Progress Report, 1 Jun. 1963–1 Jun. 1964
Thorne Shipley [1964] 67 p refs
(Contract DA-49-193-MD-2344)
(APR.-2; AD-448763)

The application of the ERG to children in nutritional surveys is felt to be its major strength. A new apparatus is described permitting the plotting of the change in the central scotoma as a function of time in the dark. A statistical analysis is presented of the ERG in 100 normal eyes. The question is raised concerning the possibility of false negative ERG responses. The Cordis portable apparatus was tested in the field, powered by a 12-V car battery, and it was found to be entirely satisfactory. A small sample of rare night-blind patients (three with entirely normal photopic acuity) has been obtained and extensively studied. Within that sample, a close correlation between adaptometric curves and the ERG was not found.
Author

N64-32400 School of Aerospace Medicine, Brooks AFB, Tex.
DYSBARISM
Harry F. Adler Feb. 1964 171 p refs *Its* Aeromed. Rev. 1–64
(AD-601600)

Definition and etiology of dysbarism, or "motion sickness," is given, with special attention to symptoms of decompression sickness from evolved or trapped gases; hypobarism and hyperbarism and associated conditions; Caisson disease; aeroembolism and aeroemphysema; and also use of the term "pompholyx." Theories of changes in the circulation and the formation of bubbles in altitude dysbarism are presented; the different systems are graded; and their effect is observed. The possible prevention of dysbarism by denitrogenation, selection of immune personnel, and the use of drugs as well as of pressure bag and pressure-cabin aircraft are discussed.
G.G.

N64-32407* National Aeronautics and Space Administration, Washington, D.C.
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography, Jun.–Jul. 1964
Sep. 1964 140 p refs
(NASA-SP-7011(02)) OTS: $1.00

An annotated bibliography is given of unclassified reports and journal articles that were introduced into the NASA information system during June and July. This bibliography concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. These references were announced earlier in separate publications by NASA, the Library of Congress, and the American Institute of Aeronautics and Astronautics. The references are indexed by subject, corporate source, and personal author.
D.E.W.

N64-32410 Rome U. (Italy) Inst. of Pharmacology and Pharmacognosy
NEUROPHYSIOLOGICAL STUDIES OF BEHAVIOR
Gianfranco Ricci 1 May 1964 13 p refs
(Grant AF-EOAR-63-90)
(AD-601689) OTS: $1.00

Three short papers are presented on these subjects: behavioral and electroencephalogram modifications induced by

anticholinergic drugs and their combination with amphetamine; modifications of cortical-evoked responses after administration of atropine and amphetamine; and studies on the modifications of the responses evoked in subcortical structures during avoidance-conditioning experiments with the monkey. D.E.W.

N64-32480 Cutler-Hammer, Inc., Deer Park, N.Y. Airborne Instruments Lab.
A STUDY OF RATE-ANALOG PROCESSING METHODS FOR PHYSIOLOGICAL DATA
George W. Morton and Robert J. Rosov Wright-Patterson AFB, Ohio, AMRL, May 1964 17 p refs
(Contract AF 33(616)-10462)
(AMRL-TDR-64-10; AD-602983)

Often the most useful information contained in signals of physiological origin is the period or repetition rate of the waveform. This information is not directly apparent through inspection of the raw signal but must be derived by an additional counting or measuring operation. A review of methods of providing a direct indication of rate, including generating trigger pulses from periodic physiological waveforms and techniques for converting the wave-repetition period into a rate analog, are presented. Particular attention is given to the electrocardiographic signals as a vehicle for demonstrating a recommended rate analog processor circuit. Author

N64-32514 Trinity Coll., Dublin (Ireland)
[INVESTIGATION OF GENETIC INSTABILITY IN BACTERIA, PARTICULARLY WITH RESPECT TO THE PRESENCE OF CONTROLLING EPISOMES] Quarterly Technical Status Report No. 1, 1 Mar.–31 May 1964
G. W. P. Dawson [1964] 9 p refs
(Contract DA-91-591-EUC-3248)
(QTSR-1; AD-449207)

Three investigations of unstable strains of *Salmonella typhimurium* are reported. The first study confirmed the following earlier indications: (1) Auxotrophic reversions of pro-401 can be increased in frequency by innoculating the broth culture from a colony that has been stored for 10 to 14 days. (2) The spectra of reversions of pro-401 differ when the revertants are characterized after 3, 6, 10, and 14 days incubation after plating on enriched minimal medium. In the second study, an unstable leucine auxotroph, a clone of leu-151, is being examined to determine whether the genetic basis of the instability remains at the same site or is at different sites in different subcultures. The third study involves an attempt to describe the pattern of instability of the double auxotroph, tryA-8 leu-13. M.P.G.

N64-32529 Iowa State U. of Science and Technology, Ames Agricultural and Home Economics Experiment Station
FAMILY ADOPTION OF PUBLIC FALLOUT SHELTERS, A STUDY OF DES MOINES, IOWA Final Report
Gerald E. Klonglan, George M. Beal, and Joe M. Bohlen 1964 192 p refs Its Rural Sociol. Rept. No. 30
(Contract OCD-OS-62-150)
(AD-603125) OTS: $6.00

An analytical frame of reference was developed that can be used for planning, implementing, and evaluating civil defense programs, involving the adoption of novel ideas or programs by individuals in target audiences. The extent to which a sample of people had adopted the idea of using public fallout shelters, in case of nuclear attack, was determined for the specific group selected. Relationships were determined and are stated between selected demographic, knowledge, attitude, and information variables and the adoption of the innovation of using the fallout shelters. D.E.W.

N64-32544 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
MEDICAL RADIOLOGY Selected Articles
28 May 1964 20 p refs Transl. into ENGLISH from Med. Radiol. (Moscow), v. 8, no. 8, 1963 p 42–48, 54–58
(FTD-TT-64-329/1+2+4; AD-606768)

CONTENTS:

1. ON THE RELATION BETWEEN ARTERIAL PRESSURE CHANGES AND THE STATE OF CERTAIN REGULATING MECHANISMS IN THE EARLY PERIODS AFTER IONIZING RADIATION A. N. Lanin p 1–10 refs

2. THE EFFECT OF WHOLE-BODY ALPHA-IRRADIATION LIPOLYTIC ENZYME INDUCTION BY CONNECTIVE TISSUE CELLS F. L. Leytes p 11–17

N64-32583 Cantonal Hospital, Geneva U. (Switzerland)
EXPERIMENTS ON X-RAY PROTECTION Quarterly Technical Status Report No. 1, 1 Feb.–30 Apr. 1964
W. Jadassohn [1964] 4 p
(Contract DA-91-591-EUC-3238)
(Rept.-1; AD-491324)

Experiments with the vicia faba test, using substances allied to serotonin, showed that Indol and Indol acetic acid (heterauxin) had no protective effect against an irradiation of 400 r. Heterauxin demonstrated a slight sensitizing effect on the primary and secondary roots. Serotonin offered excellent protection if given before the irradiation; the protective results were doubtful if it was given immediately after the irradiation. The strong protective effect of hydrocortisone hemisuccinate against X-rays was confirmed, with sodium succinate and cyclohexanol hemisuccinate showing only slight protective effects. R.L.K.

N64-32602 Baylor U., Houston, Tex.
INFLUENCE OF COOLING OF ADJACENT AREAS ON GSR AND BASE RESISTANCE OF AN ISOTHERMAL SITE
Brooks AFB, Tex., USAF School of Aerospace Med., Sep. 1963 11 p refs
(Contract AF 41(609)-1527)
(SAM-TDR-63-70; AD-448770)

In a simulation of possible field conditions, skin resistance (R) and galvanic skin response (GSR) were measured from finger sites maintained at constant temperature, while adjacent areas were cooled and rewarmed. Cooling of restricted areas up to 10 cm from the isothermal site produced negligible changes in R and variable effects on GSR amplitude. Cooling the entire hand surface to 15° C caused an initial increase in GSR amplitude followed by a steady decline to levels as much as 50% below control while R showed only minor changes. GSR count was also altered. Results are interpreted in terms of a two-component system influencing R and GSR. It is concluded that adequate technique demands maintenance of a narrow temperature range over the entire hand or foot. Author

N64-32606 Cornell Aeronautical Lab., Inc., Buffalo, N.Y.
A BIBLIOGRAPHY OF RESEARCH ON HUMAN TRACKING PERFORMANCE
Richard A. Monty, Joyce E. Obermaier, and William J. Ruby Sep. 1963 42 p refs
(CAL-131; AD-420186)

N64-32626 Air Force Systems Command, Wright-Patterson AFB, Ohio Biomedical Lab.
STUDY OF AN INORGANIC SYSTEM FOR THE RECOVERY OF OXYGEN (30-DAY EVALUATION PROGRAM) Technical Documentary Report, Jan.–May 1963
Ronald S. Huey Jul. 1964 58 p refs
(AMRL-TDR-64-30; AD-606665) OTS: $1.50

An inorganic system for the recovery of oxygen was investigated during a 30-day evaluation program. This recovered oxygen was used to provide the metabolic needs of a 3-man crew. The total system was based in sequence on 3 techniques: (1) CO_2 removal utilizing regenerable absorbers; (2) Sabatier technique for the production of water; and (3) the electrolysis of water. Techniques for the chemical analysis of gaseous constituents and the adequacy of crew accommodations and equipment under the conditions imposed by confinement were also studied. Gas chromatography proved to be the most suitable analytical technique for detecting unconcentrated trace quantities. Compounds unique to this evaluation program are given. Author

N64-32662 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
EXPONENTIAL MODEL OF BIOLOGICAL EXCRETION OF A RADIOISOTOPE AND ITS UTILIZATION WHEN CALCULATING ABSORBED RADIATION DOSAGES
Frantisek Vitex and Zdenek Dienstbier 18 Feb. 1964 9 p refs Transl. into ENGLISH from Jaderna Energie (Czechoslovakia), no. 11, 1960 p 383–385
(FTD-TT-63-923/1+2; AD-435640)

When determining absorbed dosages of radiation of an incorporated isotope, a new model was introduced, which meets the physiological conditions better than the Stewart model used at present. The new model was experimentally examined with the aid of P-32. Author

N64-32663 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
APPARATUS FOR DELIVERY OF PURE OXYGEN AND THE MEASUREMENT OF ITS CONSUMPTION IN CHRONIC EXPERIMENTS WITH SMALL ANIMALS
I. S. Breslav 24 Mar. 1964 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 49, no. 9, 1963 p 1116–1120
(FTD-TT-63-1118/1+2+4; AD-436013)

Development of an apparatus to study the gas exchange of animals through the uninterrupted delivery of oxygen into the closed system, as well as the exact measurement of its consumption was carried out with simultaneous generation of pure oxygen by a chemical reagent. E.C.

N64-32681 George Washington U., Washington, D.C. Human Resources Research Office
THE DEVELOPMENT OF TRAINING OBJECTIVES
Robert G. Smith, Jr. Jun. 1964 108 p refs
(Contract DA-44-188-ARO-2)
(HUMRRO-RB-11; AD-448364)

This bulletin describes modern concepts and techniques used in determining training objectives. A training objective is a precise clear statement of one of the performances expected of a student upon completion of a course, and a complete list of such objectives constitutes the mission of a course. The concepts and techniques described are based on research performed by both military and civilian researchers in the field of training. Author

N64-32741* National Aeronautics and Space Administration, Washington, D.C.
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography, 23 Aug.–8 Sep. 1964
Oct. 1964 154 p refs
(NASA-SP-7011(03)) OTS: $1.00

The subjects covered are the biological, physiological, pyschological, and environmental effects to which man is subjected during and following simulated or actual flight in the atmosphere or in space. Also included are effects on biological organisms of lower order, and such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life-support systems, exobiology, and personnel factors. Three organizations contribute to the publication—NASA, the American Institute of Aeronautics and Astronautics, and the Library of Congress. R.L.K.

N64-32747 Joint Publications Research Service, Washington, D.C.
PROTEINS OF THE NERVOUS SYSTEM
A. V. Palladin 12 Oct. 1964 17 p Transl. into ENGLISH from Priroda (Moscow), no. 7, 1964 p 24–31
(JPRS-26846; TT-64-51103) OTS: $1.00

The greatest activity of protein exchange takes place in the areas that are rich in nerve cells with the most intensive exchange characteristic for the proteins of the microsomes and ribosomes of the subcellular structures of the brain tissue. More water-soluble proteins are contained in the gray matter of the brain than in the white matter, and the soluble brain proteins were studied by electrophoresis on agar-agar. It was found that the brain proteins are divided into 16 groups. G.G.

N64-32748 Joint Publications Research Service, Washington, D.C.
THE MECHANISM OF THE CHANGE IN THE FUNCTIONS OF THE THYROID GLAND DURING STRESS
Yu. B. Skebel'skaya 15 Oct. 1964 21 p refs Transl. into ENGLISH from Probl. Endokrinol. i Gormonoterap. (Moscow), v. 7, 1962 p 111–118
(JPRS-26911; TT-64-51168) OTS: $1.00

The reaction of the organism to stress involves not only the ACTH of the anterior lobe of the hypophysis and the corticosteroid hormones of the adrenal cortex, but also the thyroid gland and the posterior lobe of the hypophysis. The importance of the hypothalmic area and the higher department of the central nervous system in regulation of rapid excretion of ACTH and ADH in response to injuries is stressed. G.G.

N64-32750 Joint Publications Research Service, Washington, D.C.
RESEARCH IN RADIOBIOLOGY
19 Oct. 1964 124 p refs Transl. into ENGLISH of 14 articles from Vopr. Radiobiol., Sb. Trudov (Yerevan), v. 3–4, 1963 p 53–57, 59–69, 71–109, 197–215, 275–281, 283–287
(JPRS-26956; TT-64-51212) OTS: $4.00

CONTENTS:

N64-32776 Joint Publications Research Service, Washington, D.C.

RECENT WORKS ON "SKIN VISION," THE CENTRAL NERVOUS SYSTEM, AND RADIATION SICKNESS

6 Oct. 1964 40 p refs Transl. into ENGLISH from Byull. Eksptl. Biol. i Med. (Moscow), v. 29, no. 8, 1964 (JPRS-26725; TT-64-41982) OTS: $2.00

CONTENTS:

N64-32777 Joint Publications Research Service, Washington, D.C.

THE MECHANISM OF OSMORECEPTOR STIMULATION

L. K. Velikanova and Ya. D. Finkinshteyn *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 1-5 refs (See N64-32776 24-16) OTS: $2.00

The regulation of osmomolar concentrations of an organism's internal media is realized by neurohumoral systems that are an aggregate of osmoregulatory reflexes. It is established that osmotic shift is evoked easily by introduction of small quantities of 3% to 5% hypertonic solution of sodium chloride, glucose, NaCl iso-osmotic with respect to this solution, and several other substances into the organ's arterial system. Studies in the movement of sodium and water in the blood—interstitial liquid system at a hypertonic shift—are discussed. It was found that the osmomolar concentration of venous blood during injection of a physiological solution does not change when injection of a hypertonic solution evokes a decrease of osmotic pressure. As a result of hyperosmosis in the capillaries, diffusion of sodium appears in the interstitial area with the simultaneous movement of water in the reverse direction. E.C.

N64-32778 Joint Publications Research Service, Washington, D.C.

"SKIN VISION"

S. N. Dobronravov and Ya. R. Fishelev *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 6-10 refs (See N64-32776 24-16) OTS: $2.00

Thresholds of tactile, vibrational, thermal, and color sensitivity of the skin on the fingers of the patient were determined. Studies were made to determine the influence of light, temperature of the surrounding environment, and damage of blood circulation in the fingers on the capability to determine the color and composition of drawings,. Experiments to disprove the "tactile" and "thermal" hypotheses are presented. Observations of the phenomenon of "skin vision" are noted. In "skin vision" perception, the field of vision appears to be very small. E.C.

N64-32779 Joint Publications Research Service, Washington, D.C.

THE PROBLEM OF THE DEVELOPMENT OF THE RELATIONSHIP BETWEEN OPTIC AND SKIN PERCEPTION OF LIGHT IN MAN

P. G. Snyakin *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 11–17 refs (See N64-32776 24-16) OTS: $2.00

Physiological research was conducted on the perception organs, particularly the sensory devices of the skin and eyes and their relationship to each other. Under conditions of total exclusion of visual perception, the patient had exceedingly high and fine sensitivity of the finger epidermis in differentiating light and color, and in reading and distinguishing drawings with the third and fourth fingers of the right hand. These fingers also have high sensitivity to tactile, pain, and thermal receptors. Relationship of skin photosensitivity with the ability of neural termini of the skin to perceive chemical reactions occurring under the influence of light is discussed. E.C.

N64-32780 Joint Publications Research Service, Washington, D.C.

CLINICO-HEMATOLOGICAL, BIOCHEMICAL, AND MORPHOLOGICAL CHANGES IN THE RESTORATIVE PERIOD DURING THE THERAPY OF RADIATION SICKNESS

Ye. A. Abaturova, N. K. Sviridov, G. N. Yelpat'yevskaya, and Ye. A. Zuykova *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 18–24 refs (See N64-32776 24-16) OTS: $2.00

Experiments on dogs exposed to general Roentgen radiation in a dosage of 600 R are discussed. This dosage corresponds to LD 80/30 and evokes an acute form of radiation sickness with hematologic manifestations. Immediately after radiation, all animals were given batyl alcohol (batylol) and leucogen tablets of 0.02 g each. After 6 to 7 days, one tablet of kafiride was given to each animal; they also received Biomycin and Levomycetin. The complex of chemical preparations increased the possibility of survival of irradiated animals and passage of radiation sickness. Any measure of successful therapeutic action of preparations used in the treatment of radiation sickness should be considered from their influence on the organism as a whole, and not as individual processes occurring in it that are disrupted by ionizing radiation. E.C.

N64-32781 Joint Publications Research Service, Washington, D.C.

PROPHYLACTIC ACTION OF AEROIONIZATION IN ACUTE RADIATION SICKNESS

L. V. Serova and M. I. Fedotova *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 25–30 refs (See N64-32776 24-16) OTS: $2.00

Ionization of rats by electroeffluviant aeroionizer, using the Ravich system, was conducted prior to irradiation to ascertain the effect of positive or negative aeroionization on radiational diseases. Animals irradiated with 700 R were observed for 30 days. The dynamics of death, weight, temperature of the body, indicators of gas exchange, and the condition of peripheral blood were studied. The difference in action of positive and negative aeroions under experimental conditions was found to be only quantitative, and hinges upon the fact that for attainment of a positive effect, a very short course of positive aeroionization is needed as compared with that of a course of negative aeroionization. E.C.

N64-32782 Joint Publications Research Service, Washington, D.C.

SENSITIVITY OF THE RABBIT CENTRAL NERVOUS SYSTEM TO A CONTINUOUS ULTRA-HIGH FREQUENCY ELECTROMAGNETIC FIELD

Z. M. Gvozdikova, V. M. Anan'yev, I. N. Zenina, and V. I. Zak *In its* Recent Works on "Skin Vision," the Central Nervous System, and Radiation Sickness 6 Oct. 1964 p 31–37 refs (See N64-32776 24-16) OTS: $2.00

The purpose of this study is to evaluate the sensitivity of the rabbit's central nervous system to continuous uhf electromagnetic fields of different, chiefly nonthermal intensities with long waves of 12.5 and 52 cm, and of 1 meter. Analysis of the distribution curve of latent periods on a temporal scale leads to the conclusion of a higher sensitivity of the central nervous system to electromagnetic fields of the metric range. A field with a wavelength of 52 cm has a lower biological effectiveness, and an even lower sensitivity to an electromagnetic field with a wavelength of 12.5 cm was exhibited. E.C.

N64-32796 Joint Publications Research Service, Washington, D.C.

PHYSIOLOGICAL REACTIONS OF ANIMALS DURING FLIGHTS ON THE THIRD, FOURTH, AND FIFTH SPACESHIP-SATELLITES

O. G. Gazenko, I. I. Kas'yan, A. R. Kotovskaya, Ye. M. Yuganov, and V. I. Yazdovskiy 20 Oct. 1964 18 p refs Transl. into ENGLISH from Izv. Akad. Nauk. SSSR, Ser. Biol. (Moscow), No. 4, Jul./Aug. 1964 p 497–510
(JPRS-26994; TT-64-51250) OTS: $1.00

Flights of experimental animals into the near space on cosmic spaceship–satellites showed an absence of pathological changes in the circulatory and respiratory systems during and after flight. Functional changes in basic physiological functions of the animals were the most pronounced during the orbital insertion of the ship and its return to earth. During the period of weightlessness indices of the cardiovascular system in the majority of the dogs returned to initial values by the second to third orbit. During the condition of weightlessness, both an increase and a decrease in respirations was noted. Author

N64-32813 George Washington U., Washington, D.C. Human Resources Research Office

AN ANNOTATED BIBLIOGRAPHY ON PROFICIENCY MEASUREMENT FOR TRAINING QUALITY CONTROL Research Memorandum

Robert G. Smith, Jr. Jun. 1964 29 p
(Contract DA-44-188-ARO-2)
(AD-448362)

This annotated bibliography on quality control in training includes references from a variety of sources, listed alphabetically by author within the following categories: general, test manuals, test methods, quality-control systems, and test development and description. M.P.G.

N64-32833* General Technical Services, Inc., Cleveland, Ohio

STUDY OF THE GENERAL DYNAMICS OF THE PHYSICAL–CHEMICAL SYSTEMS IN MAMMALS

A. S. Iberall Washington, NASA, Oct. 1964 119 p refs
(Contract NASw-1066)
(NASA-CR-129) OTS: $2.75

Development of ideas of how the biological systems are coordinated for regulation and control purposes is discussed. The discussion is divided into the following areas: (1) temperature regulating system; (2) cardiovascular system—geometry-topology of the arterial system, and regulation and control in the cardiovascular system; (3) reprise on the cardiovascular and thermoregulating systems; (4) the nature of living systems;

(5) hormonal dynamics—the water oscillator, 2-minute heat-production cycle, 7-minute blood-flow cycle, 30-minute metabolic-product-release cycle, and 3-day water-balance cycle; and (6) behavioral systems—Freud Libido theory of psychosexual development, M. Klein's theoretic views, and H. S. Sullivan's views. Transmission–attenuation characteristics of the arterial system are discussed in an appendix. P.V.E.

N64-32865 Adaptronics, Inc., Alexandria, Va.
A COMPILATION OF BIOLOGICAL LAWS, EFFECTS, AND PHENOMENA, WITH ASSOCIATED PHYSICAL ANALOGS
Final Report
L. O. Gilstrap, Jr., J. S. Mc Neil, L. P. Greenberg, and R. B. Spodak Wright-Patterson AFB, Ohio, AF Avionics Lab., Jun. 1964 613 p refs
(Contract AF 33(657)-7099)
(AD-604369)

A compilation of biological laws, effects, and phenomena and their associated physical analogs is presented. Information on each law, effect, or phenomenon is contained in separate entries that are grouped roughly into sections by similarity of content. Entries are cross referenced by animals and plants mentioned in each entry, by sample physical devices, systems, effects or phenomena analogous to the described biological law, effect or phenomenon in each entry, and by physical class (i.e., by the branch of physical science most relevant to the biological description), and by physical operator (i.e., by the categories of sensor, transformer, or actuator, whichever is more nearly descriptive of the entry). Author

N64-32947* Massachusetts Inst. of Tech., Cambridge
MENTALISM IN LINGUISTICS
Jerrold J. Katz Repr. from Language, v. 40, no. 2, Apr.–Jun. 1964 p 124–137 refs
(Grants NsG-496; NSF G-16526; NIH-MH-04737-03; Contracts DA-36-039-AMC-03200(E); AF 19(628)-2487)

The three fundamental questions with which a synchronic description of a particular language deals are these: (1) What is known by a speaker fluent in a natural language? (2) How is such linguistic knowledge put into operation to achieve communication? and (3) How do speakers come to acquire this ability? The difference between taxonomic and mentalistic concepts of linguistics lies in how the theories built on these concepts answer the above questions. Because taxonomic linguistics concern themselves only with facts relevant to structure, whereas mentalistic linguistics seek a full answer to all three questions, the taxonomic concepts are rejected by the mentalist. A.W.

N64-32954 Joint Publications Research Service, Washington, D.C.
EFFECTS OF SOUND AND NUCLEIC ELEMENTS ON CELLS
5 Oct. 1964 17 p refs Transl. into ENGLISH of 3 articles from Izv. Sibirsk. Otd. Akad. Nauk SSSR, Ser. Biol.-Med. Nauk, (Novosibirsk), no. 4, Sept. 1, 1964
(JPRS-26712; TT-64-41969) OTS: $1.00

CONTENTS:

1. THE STIMULATING EFFECT OF HIGH-FREQUENCY ULTRASOUND ON THE REPRODUCTION OF YEAST CELLS G. S. Komolova and N. P. Gracheva p 1–5 refs (See N64-32955 24-16)

2. ON THE RELATIONSHIP BETWEEN THE ELEMENTS OF A NUCLEUS AND THE CYTOPLASM D. F. Petrov p 6–10 refs (See N64-32956 24-16)

3. THE ACTION OF ULTRASOUND IN YEAST RIBONUCLEIC ACID SOLUTIONS IRRADIATED WITH AND WITHOUT CAVITATION IN THE MEDIUM M. S. Levinson and V. P. Nefedov p 11–14 refs (See N64-32957 24-16)

N64-32955 Joint Publications Research Service, Washington, D.C.
THE STIMULATING EFFECT OF HIGH-FREQUENCY ULTRASOUND ON THE REPRODUCTION OF YEAST CELLS
G. S. Komolova and N. P. Gracheva *In its* Effects of Sound and Nucleic Elements on Cells 5 Oct. 1964 p 1–5 refs (See N64-32954 24-16) OTS: $1.00

The stimulating effect of ultrasound upon the growth of yeast in a synthetic nutritive medium and in a naturally nutritive medium was investigated. High ultrasonic frequencies were used in order to expose the microorganisms to sound with sufficient intensity, without causing cavitation in the medium. It is concluded that with suppression of cavitation in the medium, ultrasonic waves can increase the output of biological mass in yeast production. P.V.E.

N64-32956 Joint Publications Research Service, Washington, D.C.
ON THE RELATIONSHIP BETWEEN THE ELEMENTS OF A NUCLEUS AND THE CYTOPLASM
D. F. Petrov *In its* Effects of Sound and Nucleic Elements on Cells 5 Oct. 1964 p 6–10 refs (See N64-32954 24-16) OTS: $1.00

A hypothesis is outlined that can be used to elaborate the following problems: (1) the change in the phenotypical manifestation of a number of interacting genes in *cis-* and *trans-*position and the "position effect" in connection with the inclusion of informational RNA of such genes in one or various ribosomes; (2) the problem of the stage development and aging as a result of accumulation in the cytoplasm of ribosomes with various forms of long-lived informational nucleic acid; (3) the problem of the possibility of the transmittal of hereditary information of somatic cells with changes in the hereditary structure into the sexual cells, by means of the transmittal via the body fluids, of the nucleic acid and the subsequent inclusion of that nucleic acid in the chromosomes of the sexual cells. P.V.E.

N64-32957 Joint Publications Research Service, Washington, D.C.
THE ACTION OF ULTRASOUND IN YEAST RIBONUCLEIC ACID SOLUTIONS IRRADIATED WITH AND WITHOUT CAVITATION IN THE MEDIUM
M. S. Levinson and V. P. Nefedov *In its* Effects of Sound and Nucleic Elements on Cells 5 Oct. 1964 p 11–14 refs (See N64-32954 24-16) OTS: $1.00

Experiments carried out in order to study the influence of ultrasound upon nucleic acids (particularly ribonucleic acid) are discussed. The results of the experiments established that cavitational frequencies (0.8 Mc/sec) and noncavitational frequencies (2.4 and 4.0 Mc/sec) exert different influences upon the RNA molecule. The effect of elastic oscillations, which occur at noncavitational frequencies, does not cause any changes in the RNA molecules. Measurements were also made of pH in the RNA solutions of various concentrations before and after exposure to ultrasound, and in the distilled water used in the experiments. It was found that changes in pH in the solutions exposed to ultrasound depended upon the RNA

concentration. In a 0.2% solution of RNA exposed to ultrasound, there was no drop in the pH. P.V.E.

N64-32981 School of Aerospace Medicine, Brooks AFB, Tex. Dental Sciences Lab.
CORTISONE ORAL GLUCOSE TOLERANCE RESPONSES IN HEALTHY YOUNG ADULT MALES CLASSIFIED AS TO ORAL HEALTH STATUS
Ira L. Shannon and William A. Gibson Sep. 1964 13 p refs (SAM-TDR-64-57; AD-449445)

Cortisone-supplemented oral-glucose tolerance tests were carried out on 156 apparently healthy young adult males. Results were compared with those from 300 other subjects who underwent conventional oral-glucose tolerance testing. All subjects were classified as to dental caries experience and periodontal index rating. The addition of cortisone to the oral-glucose tolerance-testing procedure increased the means for serum glucose at each sampling interval. In neither the conventional nor the cortisone-supplemented groups was there a significant indication that glucose tolerance responses could be related to either dental caries experience or periodontal index. Author

N64-32986 Western Australia U., Perth
REPORT ON RESEARCH, 1 JULY 1962–31 DECEMBER 1963
[1963] 284 p

This is a research report containing current programs of the departments of physics, chemistry, civil and electrical engineering, and mathematics. G.G.

N64-33010 Joint Publications Research Service, Washington, D.C.
INFORMATION THEORY AND PERCEPTION
12 Oct. 1964 76 p refs Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 4, Jul.–Aug. 1964 p 3–38, 83–93, 99–114
(JPRS-26839; TT-64-51096) OTS: $3.00

CONTENTS:

1. ON THE PROBLEM OF THE STUDY OF TECHNICAL THINKING T. V. Kudryavtsev and I. S. Yakimanskaya p 1–22 refs
2. AN EXPERIMENT IN APPLYING INFORMATION THEORY TO ANALYSIS OF THE PROCESS OF MAN'S SOLUTION OF THINKING PROBLEMS O. K. Tikhomirov, Ya. Ya. Belik, E. D. Poznyanskaya, and N. Kh. Turchenkova p 23–43 refs
3. CERTAIN FEATURES IN PERCEPTION OF INFORMATION FROM INDICATORS WITH FIGURE AND POINTER SYSTEMS OF READING A. A. Krylov p 44–53 refs
4. ON THE PROBLEM OF THE PROBABILISTIC ANALYSIS OF ELECTROENCEPHALOGRAMS Ye. Ya. Voytinskiy and V. A. Pryanishinikov p 54–61 refs
5. THE RECEPTION AND SUBSEQUENT TRANSMISSION OF A SPEECH MESSAGE V. D. Tunkel p 62–73 refs

N64-33019* Mississippi State U., State College
AN EXTRACELLULAR POLYSACCHARIDE PRODUCED BY *PALMELLA MUCOSA* KUTZ
R. G. Tischer and B. G. Moore Repr. from Arch. Mikrobiol. (Berlin), v. 49, 1964, p 158–166 refs
(Grant NsG-80)

This paper pertains to the extracellular polysaccharide produced by the algae *Palmella mucosa* Kütz and its composition; the effects of different carbon and nitrogen sources on its synthesis; the rate of its formation; and its biosynthetic route. G.G.

N64-33041* California U., Los Angeles UCLA Health Sciences Center
NORMAL SLEEP PATTERNS IN THE MACAQUE MONKEY
M. L. Reite, J. M. Rhodes, E. Kavan, and W. R. Adey [1963] 29 p refs
(Grant NsG-505)
(NASA-CR-59001) OTS: $2.00 fs; $0.50 mf

The electrical activity of the cortex and various deep-brain structures of the monkey *Macaca nemestrina* during sleep was observed by bipolar surface and implanted EEG electrodes, and to a sound stimulus the average evoked responses are by eye movements. The sleep phases were found to be cyclic, resembling human sleep, but the longest segment occured in the early part of the night. G.G.

N64-33044* Schwarz Bioresearch, Inc., Orangeburg, N.Y.
SUPERIOR DIET FOR MAN IN SPACE Quarterly Report, Apr.–Jul. 1964
Norman A. Rosenthal Jul. 1964 35 p refs
(Contract NASw-517)
(NASA-CR-59003) OTS: $2.00 fs; $0.50 mf

The means for introducing additional calcium into liquid diets to permit establishment of favorable Ca/P ratios was achieved by solubilizing insoluble Ca_3 (citrate)$_2 \cdot 4H_2O$ in the chelated form, i.e., Ca_3 (citrate)$_2 \cdot 10$ H citrate. Followup studies of the effects of liquid diet concentration and water balance on rat survival reveal that in terms of growth response, diet concentrations of 30% appear to be optimal, regardless of whether or not the animals are allowed free access to a source of water. In a comparison of the relative merits of glucose and the water soluble polymeric form of glucose, i.e., dextran, as dietary sources of energy, a mixture of 80% glucose–20% dextran appeared to be more efficient than the use of glucose alone. Preliminary studies of the comparative effects of increased caloric supplementation of the diet with both glucose and lipids indicate that carbohydrates may be favored over lipids. Comparative studies of the relative merits of L-methionine and L-ethyl cysteinate·HCl reveal that the presence of the latter definitely exerts a growth inhibitory effect. Author

N64-33058 Joint Publications Research Service, Washington, D.C.
BERYLLIUM AND ITS RELATION TO INDUSTRIAL HYGIENE
22 Oct. 1964 81 p refs Transl. into ENGLISH from RUSSIAN periodicals
(JPRS-27031; TT-64-51287)

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N64-33080* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Hampton, Va.

EXAMINATION OF ONBOARD TRAINING FOR EXTENDED SPACE FLIGHTS

Richard Reid and R. T. Saucer Washington, NASA, Nov. 1964 30 p ref

(NASA-TN-D-2162) OTS: $0.75

A method with small weight and volume requirements for maintaining pilot skills for extended space flights was studied. The method makes use of onboard displays, controls, and attitude fuel without degrading the overall system reliability. The method uses electronically generated disturbance signals that are summed with manual control inputs to the attitude stabilization system. The disturbance signals create perturbations on the spacecraft. The pilot then obtains real training by controlling the attitude of the spacecraft in the presence of the perturbations. Since the disturbance-signal generation requires insignificant weight and volume, the system was evaluated for attitude-fuel requirements in terms of training time available. Author

N64-33095* Lockheed-California Co., Burbank Physical and Life Sciences Lab.

INVESTIGATION OF THE EFFECTS OF IONIZING RADIATION ON THE CENTRAL NERVOUS SYSTEM IN VIVO AND IN VITRO

Eberhardt K. Sauerland and Robert S. Gordee Jul. 1964 84 p refs

(Contract NASw-787)

(NASA-CR-58974; LR-18025) OTS: $3.00 fs; $0.75 mf

The effects of ionizing radiations on the central nervous system of cats were investigated by using deeply implanted brain electrodes. In cats exposed to 4000- and 2000-r head X-irradiation, a profound effect was seen in the form of a high-voltage slow-wave syndrome. Subcortical areas such as the hippocampus and the amygdaloid nuclei showed spontaneous spiking and at higher doses gradually became isoelectric. A significant lowering of the seizure threshold also appeared, and cortical postirradiation effects seemed to appear later and secondary to subcortical effects. Measurements in the hyppocampus showed an immediate drop in impedance magnitude after irradiation, followed by extensive excursions in the magnitude of resistive and reactive components and in their ratio. In exploring the effects of ionizing radiation at the cellular level much effort was devoted to establishing satisfactory experimental approaches. Techniques for the growth of neurons and neuroglial cells in vitro are described. R.L.K.

N64-33099* National Research Corp., Cambridge, Mass. Research Div.

STUDY OF VIABILITY OF MICROORGANISM IN SIMULATED SPACE Final Report, Apr. 21, 1963–May 31, 1964

Gerald J. Silverman, Cecil B. Dunn, Ray Barrett (MIT), Rosario P. Giammanco, and Philip Blum 10 Aug. 1964 22 p

(Contract NASw-773; NRC Proj. 81-1-0102)

(NASA-CR-59092) OTS: $1.00 fs; $0.50 mf

Among spores of four test organisms subjected to uhv and ultraviolet radiation, *A. niger* proved the most resistant; *B. megaterium*, *B. subtilis*, and *B. stearothermophilus* proved about equally less resistant. All four spores were less radioresistant when uhv-dried than when air-dried. Among spores of four test organisms subjected to uhv and gamma radiation, *B. megaterium* proved the most resistant; *A. niger* proved least resistant; *B. subtilis* and *C. sporogenes* were of intermediate resistivity. All four spores were less radio-resistant when uhv-dried than when wet. Microbial flora of dried desert soil withstood 200° C simultaneously with uhv for five days. Soil isolates showed considerably less resistivity, however, thus confirming that soil serves as a protective agent against thermal destruction. Three vegetative microorganisms subjected simultaneously to elevated temperatures and uhv showed a rapid decrease in survival as temperatures rose above approximately 50° C. Author

N64-33102 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.

CHANGES IN THE STEREOTYPE OF CONDITIONED RESPIRATORY REFLEXES AND RESPIRATORY RESPONSES TO CO_2 UNDER THE INFLUENCE OF CHLORPROMAZINE

Yu. N. Ivanov and Ye. I. Semeyko 2 Mar. 1964 13 p refs Transl. into ENGLISH from Zh. Vysshei Nervnoi Deyatel'nosti (Moscow), v. 13, no. 4, 1963 p 680–685

(FTD-TT-64-69/1+2+4; AD-432209)

The effects of chlorpromazine on the respiratory mechanism of dogs were studied by exposure to a mixture of 2.5% to 3% carbon dioxide and air before and after the injection of chlorpromazine at 2 to 3 mg/kg of weight. The animals were prepared by removing of the vision, auditory, and olfactory receptors and by exposing the vagus nerve on the neck. The course of respiratory conditioned and unconditioned responses was observed by the rhythmic stereotype of respiratory conditioned reflexes to four positive and four differential alternating stimuli. It was found that changes of the respiratory responses to carbon dioxide by administration of chlorpromazine are more pronounced in the control animals than in the dogs deprived of the sensory mechanisms and observation during the course of respiratory conditioned and unconditioned responses under the effect of chlorpromazine point to the cerebral cortex of higher animals as being the main site of the closure of conditioned reflex temporary connections. G.G.

N64-33104 Göttingen U. (W. Germany)

QUINOID COMPOUNDS IN PHOTOSYNTHETIC REACTIONS OF ISOLATED CHLOROPLASTS Scientific Report No. 1

A. Trebst 1 May 1964 11 p refs

(Contract AF 61(052)-716)

(AFCRL-64-760; AD-448996)

The quinone-stimulated photo-oxidation of ascorbate in isolated chloroplasts is coupled to ATP formation and is inhibited by DCMU. The stoichiometry of one ATP to one H_2O_2 formed suggests a tight binding of ascorbate photo-oxidation onto the electron transport chain of chloroplasts. The p-phenylendiamines reverse the DCMU inhibition of photosynthetic

NADP-reduction. This reaction is not coupled to ATP formation, excluding a photophosphorylation site between the first light reaction of photosynthesis and NADP-reduction. The light inactivation of the Hill reaction with ferricyanide in chloroplasts is prevented by the addition of minute amounts of substituted quinones. Author

N64-33124* Stanford Research Inst., Menlo Park, Calif.
STUDIES ON THE HILL REACTION ACTIVITY OF SOLUBLE CHLOROPLAST EXTRACTS Quarterly Progress Report No. 6, 1 Jun.–31 Aug. 1964
Lloyd K. Moss and Janice E. B. Coomber 8 Oct. 1964 5 p
(Contract NAS4-49(11))
(NASA-CR-59220) OTS: $1.00 fs; $0.50 mf

The mechanisms and essential reactants of that part of the photosynthetic process in which oxygen is produced by photolysis of water are being studied. The manometric polarographic electrode method of measuring Hill reaction activity was begun. Chloroplast fragment preparations were studied for oxygen-evolving activity as a function of the amount of biocatalyst. P.V.E.

N64-33138 Atomic Energy Commission, Washington, D.C. Div. of Biology and Medicine
REPORTS ON ATOMIC RADIATION SUBMITTED TO THE UNITED NATIONS SCIENTIFIC COMMITTEE ON THE EFFECTS OF ATOMIC RADIATION, SUPPLEMENT 2 An Atomic Radiation Bibliography, 15 May 1962–1 Jun. 1964
Alfred W. Klement, Jr., comp. Jun. 1964 23 p
(TID-3909 (Suppl. 2)) OTS: $0.50

N64-33159* Naval School of Aviation Medicine, Pensacola, Fla.
THE ELEVATOR ILLUSION: APPARENT MOTION OF A VISUAL TARGET DURING VERTICAL ACCELERATION
Jorma I. Niven, Thomas C. D. Whiteside, (RAF) and Ashton Graybiel 18 Oct. 1963 18 p refs Joint Report with NASA
(NASA Order R-93)
(NASA-CR-59180) OTS: $1.00 fs; $0.50 mf

Two normal and two labyrinthine defective subjects were exposed to vertical accelerations of either less than 1 g or more than 1 g on descent or ascent, respectively, in an elevator, while viewing a real target, a visual afterimage, or a combination of both. Normal subjects tended to perceive an apparent downward movement of the real target when $g < 1$ and an upward shift when $g > 1$; for a visual afterimage, the relationships were reversed. The labyrinthine defectives did not perceive apparent movement of the real target at anytime and were uncertain with respect to the afterimage. Involuntary upward eye movements in response to a change from 1 g to zero g were subsequently demonstrated in normals, but no such movement could be shown in a labyrinthine defective subjects. Author

N64-33189* Space/Defense Corp., Birmingham, Mich.
[RESPIROMETER AND LIFE SUPPORT SYSTEM FOR A POTATO IN SPACE ENVIRONMENT] Second Quarterly Status Report, 4 May–14 Aug. 1964
Donald L. Foster 31 Aug. 1964 10 p
(Contract NASw-870)
(NASA-CR-58945; TR-64-107) OTS: $1.00 fs; $0.50 mf

Problems encountered in the development and operation of a breadboard respirometer and life-support system to maintain a potato specimen in a simulated space environment for a period of 90 days are discussed. Performance tests of the total system and evaluation of the breadboard instrument are presented in detail; it appears that the instrument is operating satisfactorily. E.C.

N64-33195* Harvard U., Cambridge, Mass.
[EFFECTS OF HIGH ENERGY PROTONS ON BIOLOGIC PROCESSES AND LIVING SYSTEMS] Seimannual Status Report, Jan. 15–Jul. 15, 1964
Raymond N. Kjellberg and William H. Sweet [1964] 17 p refs
(Grant NsG-262-63)
(NASA-CR-5887) OTS: $1.00 fs; $0.50 mf

A neuro-opthalmological test was devised to determine a biological end point for proton-beam tolerance of the II-VI cranial nerves. In another investigation monkeys were spin-irradiated in the lower thoracic region at the mid-dorsal level, using a knifelike proton beam for determination of anatomic change. The technique of making two focal lesions in the two hemispheres of a monkey's brain and comparing their size as a measure of biological effect was extended to measure the effect of dose rate. The effect of low-dosage long-term total-body proton radiation as a defense against bacterial invasion was studied. A technique of measuring the amount of halogen acid produced in the HAP dosimeter by ionizing radiation was developed. Other studies involved intercranial Bragg peak proton irradiation of humans for various disorders, biologic protection against proton radiation, quantitative histopathology, electrophysiologic changes, behavioral changes, mammalian proliferative tissues and cells, mapping of dose distributions, and quantitative positron scanning. R.L.K.

N64-33208* American Inst. for Research, Pittsburgh, Pa.
HUMAN FACTORS INFORMATION REQUIREMENTS FOR SPACE SYSTEM DEVELOPMENT Quarterly Status Report, 1 Apr.–30 Jun. 1964
[1964] 9 p
(Contract NASr-194)
(NASA-CR-59050) OTS: $1.00 fs; $0.50 mf

Comments from interviews with life scientists, human-factors engineers, and other system-development personnel were organized into 74 individual requirements for improved human-factors information to support the development of space systems. These were evaluated in terms of the development decisions supported and of the relationship of each requirement to other requirements. The 74 requirements are grouped and listed. R.L.K.

N64-33211* Martin Co., Baltimore, Md. RIAS Div.
RESEARCH IN PHOTOSYNTHESIS Quarterly Report No. 5, 6 Jun.–6 Sep. 1964
Bessel Kok [1964] 7 p
(Contract NASw-747)
(NASA-CR-59204) OTS: $1.00 fs; $0.50 mf

Efforts to reactivate photosynthesis in dark, cold, aged bean leaves were concentrated on the restoration of Hill activity in inactive chloroplasts by addition of cofactors, compounds with oxidation–reduction capacity, and protein fractions of active chloroplast from bean leaves in an attempt to localize the lesion in photosystem II. Described are the effects of adding several auto-oxidizable compounds to the oxygen exchange rate in the illumination of chloroplasts. To test the interaction between photophosphorylation and photoevolution of oxygen, various compounds were added to phosphorylation uncouplers in an attempt to reverse their inhibition of oxygen evolution. *Chrisomonad Ochromonas danica* and a mutant

of *Scenedesmus* were studied as sources of photosynthetic information. Improvement difference spectroscopy has yielded a time resolution that is compatible with that of the cat, which is equivalent to 60μsec per station; the apparatus was able to observe in chloroplasts a very fast decaying photoconversion and possibly a consecutive reaction with a half-time of 100 to 200 μsec. R.L.K.

N64-33261* Rochester U., N.Y.
ILLUMINATION DEPENDENCE OF ENHANCEMENT
T. T. Bannister and M. J. Vrooman Repr. from "Photosynthesis Mech. in Green Plants", Publ. No. 145, Washington, NAS-NRC, 1963 p 391–399 refs
(Grant NsG-(T)-73)

The subject of this paper is the dependence of enhancement in *Chlorella pyrenoidosa* str. 3, on short-wave (482 mμ) and far-red (696 mμ) illuminations. Two enhancement functions were determined, the enhancement (E) and the excess (D): $E = (p_{12}-p_1)/p_2$ and $D = p_{12}-p_1-p_2$. Here p_1, p_2, and p_{12} are the steady-state photosynthesis rates in short-wave, far-red, and the two lights together, respectively. To facilitate reference to illumination curves of photosynthesis, p_1, p_2, p_{12}, and D were expressed as rates relative to the saturated rate in white light. The observed functions $E(I_1, I_2)$ and $D(I_1, I_2)$ were compared with these predicted by the "spill-over" and "separately packaged pigment" models of enchancement. The predicted functions, which are the same for both models, explain many, but not all, characteristics of the observed functions. Author

N64-33264* Massachusetts Inst. of Tech., Cambridge Research Lab. of Electronics
LOCAL, SEGMENTAL AND SUPRASPINAL INTERACTION WITH A DORSOLATERAL SPINAL CUTANEOUS AFFERENT SYSTEM
Arthur Taub Repr. from Exptl. Neurol., v. 10, no. 4, Oct. 1964 p 357–374 refs
(Grants NsG-496; AF-AFOSR-591-64; NIH MH-04737-04; Contracts DA-36-039-AMC-03200(E); AF 33(615)-1747)

The mutability of the receptive field characteristics of single units in the spinocervical tract of the cat through local, segmental, and supraspinal mechanisms is demonstrated in decerebrate and spinal preparations. Locally, a discrete, nonconcentric, easily fatiguable afferent inhibition, produced by light brushing and cold, is described. Segmentally, strong stimulation of the distal extremities is found to inhibit spontaneous or evoked activity in the spinocervical tract in a variety of patterns that are suggested to be related to reflex progression. Electrical stimulation of the mesencephalic tegmentum, cerebellar nuclei, and a central pontobulbar core is shown to produce a 35% constriction of receptive field area and a generalized decrease in receptive field responsiveness, with the preservation of a small, sensitive, "central" region. Author

N64-33277* Chicago U., Ill. Research Inst.
INTEGRATED RESEARCH AND TRAINING PROGRAM IN MOLECULAR BIOLOGY (ULTRASTRUCTURE AND ELECTRON MICROSCOPY) Annual Progress Report, 1963–1964
Humberto Fernandez-Moran [1964] 73 p
(Grants NsG-441-63; AT(11-1)-1344 Res; NIH PHS-MR-943)
(NASA-CR-59151) OTS: $3.00 fs; $0.75 mf

Described and pictured are the laboratories that allow high-resolution electron microscopy independent of ambient conditions on almost a 24-hour basis, operating under "clean room" conditions. The research program includes the following: (1) continuation of correlated electron microscope and biochemical studies of mitochondrial membranes, which have resulted in the detection and isolation of a fundamental unit of energy transduction (electron transfer particle); (2) electron microscopic and biochemical studies of pyruvate dehydrogenase complex of *Escherichia coli*; (3) application of low-temperature methods (cryofixation), using liquid helium II; (4) electron microscope and electron diffraction studies of DNA macromolecules in pollution, using such special techniques as vacuum-tight microchambers, low-intensity microbeam illumination, etc; (5) correlated electron microscope and electron diffraction studies of certain meteorites (Orgueil carbonaceous chondrite); (6) electron microscopy studies of Precambrian organized systems; and (7) development of techniques for electron optical examination of extraterrestrial matter. R.L.K.

N64-33284* Naval School of Aviation Medicine, Pensacola, Fla.
DOSIMETRIC EVALUATION OF DATA ON THE SOLID ANGLE BREAKDOWN OF SHIELD THICKNESS FOR THE APOLLO VEHICLE
Hermann J. Schaefer 19 Aug. 1964 19 p refs Joint report with NASA
(NASA Order R-75)
(NASA-CR-59266) OTS: $1.00 fs; $0.50 mf

Detailed data on the directional shielding characteristics of the Apollo vehicle are evaluated for a typical flare-produced proton spectrum with regard to residual flux and depth distribution of absorbed dose and enders count in a tissue phantom in the command module. By replacing the actual irregular distribution of shield thickness by an equivalent ordered arrangement, the computational analysis is greatly simplified, yet still allows establishing upper and lower limits for the exposure in the actual system. Total dose and enders count in the surface vary between 1.27 and 0.45 rads/hour or 282 and 68 enders/sec $gram_T$, respectively. Minimum depth dose is 0.23 rads/hour or 28 enders/sec $gram_T$. The complex relationships governing the percentage distribution of solid angles of different shield thicknesses to the exposure are investigated. Author

N64-33286* Chicago U., Ill.
ANALYTICAL SYSTEMS FOR BIOLOGICAL STUDY OF MARS. THE ROLE OF ELECTRON MICROSCOPY AND ELECTRON OPTICAL TECHNIQUES IN EXOBIOLOGY
Humberto Fernández-Morán [1964] 10 p refs
(Grant NsG-441)
(NASA-CR-59251) OTS: $1.00 fs; $0.50 mf

The advantages and problems of low-temperature electron microscopy are discussed. With this technique, labile structures can be observed more clearly and thermal vibrations are suppressed. The experimental method is detailed and illustrated by directly examining the phase transitions of ice from cubic to hexagonal form. Preliminary data are presented on the possibility of sectioning unfixed, rapidly frozen, biological tissue. Plans for a cryogenic microscope are presented. This device has the advantages of perfect vacuum, a completely stable set of superconducting lenses, and the absence of thermal vibrations. D.E.W.

N64-33288* Republic Aviation Corp., Farmingdale, N.Y. Space Environment and Life Sciences Lab.
STUDY OF THE NORMAL FECAL BACTERIAL FLORA OF MAN Quarterly Progress Report, 1 Jul.–30 Sep. 1964
Lorraine S. Gall 6 Oct. 1964 8 p

(Contract NASw-738)
(NASA-CR-59257; RAC-931-5) OTS: $1.00 fs; $0.50 mf

The work was primarily concerned with isolation of bacteria from normal healthy males and the study of their carbohydrate metabolism. A rapid morphological-type culture screening was also set up, in addition to the regular-type culture screening. Microscopic examination of fecal dilutions revealed a number of readily distinguishable morphological types of bacteria that recurred frequently. In assessing reproducibility of the techniques used, it was generally found that the morphological types in duplicate dilution tubes were very dissimilar. Fecal anaerobe-type cultures were studied further in an attempt to identify them according to Bergey's manual. In manometric fermentation-balance studies, cultures were tested for their ability to ferment glucose, lactose, maltose, and starch. The FA-4, 5, 6, and 11 had similar fermentation patterns. Starch was utilized at a higher rate than glucose, which is characteristic of *Actinomyces bifidus*. R.L.K.

N64-33331* Naval School of Aviation Medicine, Pensacola, Fla. Bur. of Medicine and Surgery
ORIENTATION OF THE ROTATION-AXIS RELATIVE TO GRAVITY: ITS INFLUENCE ON NYSTAGMUS AND THE SENSATION OF ROTATION Report No. 96
Fred E. Guedry, Jr. 30 Jun. 1964 26 p refs
(NASA Order R-93)
(NASA-CR-59286) OTS: $2.00 fs; $0.50 mf

Subjective phenomena and nystagmus were compared under two conditions of rotation, one in which the axis of rotation was vertical, i.e., aligned with gravity, and one in which the rotation-axis was horizontal. When the axis of rotation was horizontal, normal subjects exhibited nystagmus and sensations of rotation for periods of three minutes (and longer); deceleration produced very brief postrotational reactions. L-D subjects, men presumed to be without vestibular function, did not exhibit nystagmus or report sensations comparable to those of normal subjects for either the vertical or horizontal axis of rotation. Because prolonged nystagmus occurred almost exclusively in normal subjects when the rotation axis was horizontal, it is concluded that vestibular function is a necessary condition for this response and that it may be dependent upon the continuous reorientation of the otolith system relative to gravity. Author

N64-33341* Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
STUDIES OF MANUAL CONTROL SYSTEMS Progress Report No. 3, 19 Oct. 1963–18 Apr. 1964
15 Sep. 1964 33 p refs
(Contracts NASw-668; AF 33(657)-10124)
(NASA-CR-59258) OTS: $2.00 fs; $0.50 mf

A sampled-data model for the human controller in time-invariant control systems is proposed. The model is based on the Young eye movement and the Lemay–Westcott hand-tracking models. It has a pursuit channel that provides memory for making smooth almost continuous movements, a saccadic channel for making sudden step movements, and a force programer for driving the muscle–hand system. The variable parameters of the model are identified, and the model is extended to systems having time-varying controlled element dynamics in which the human controller adjusts his characteristics to compensate for the variations in these dynamics. Experimental data show that for sudden changes in dynamics the human controller's adaptive process is composed of four phases: (1) detection of a change, (2) stabilization, (3) reduction of accumulated errors, and (4) optimization of dynamics. Author

N64-33344 Joint Publications Research Service, Washington, D.C.
SEQUENTIAL PROBLEMS IN SOVIET BIOCHEMISTRY
N. M. Sisakyan 26 Oct. 1964 17 p Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 57, no. 3, 1964 p 337–349
(JPRS-27063; TT-64-51319) OTS: $1.00

This article gives an overall view concerning methods of investigations of physiochemical processes in biochemistry and their applications in industry. An analysis of these processes, not only on the molecular level but also on the submolecular level, with the help of quantum chemistry is predicted. The synthesis of pure enzymes by methods of separation of proteins by fractionation, particular zone electrophoresis, chromatography with ion-exchange resins on a cellulose base, and by filtering through gels with molecular sieve properties is pointed out. G.G.

N64-33345 Joint Publications Research Service, Washington, D.C.
THE CHEMICAL BASES OF THE VIRULENCE AND PATHOGENICITY OF MICROORGANISMS
Ye. M. Gubarev 29 Oct. 1964 20 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 58, no. 1 (4), Jul.-Aug. 1964 p 74–85
(JPRS-27146; TT-64-51402) OTS: $1.00

This article covers mainly those enzymes of bacterial cells that contribute to the virulence and pathogenicity of microorganisms. The chemical factors, and especially the bacterial enzymes and their toxins, neurotoxins, lecithinase, and decarboxylase in the pathogenesis of several infections, are discussed. G.G.

N64-33352 Ohio State U. Research Foundation, Columbus
VISUAL RECOVERY FROM BRIEF EXPOSURES TO VERY HIGH LUMINANCE LEVELS
Glenn A. Fry and Norma D. Miller Brooks AFB, Tex., School of Aerospace Med. Aug. 1964 30 p refs
(Contract AF 33(657)-9229)
(SAM-TDR-64-36; AD-449479)

The design and calibration of the apparatus for delivering brief, high-intensity flashes from a xenon-filled flash tube are described. A maximum field luminance of 4.4×10^5L was provided by the flash tube seen by maxwellian view. A rotating mirror was synchronized with the flash-tube discharge to produce exposure durations from 42μsec. to 1.4 msec. Field sizes can be varied from a point source to 10°. An adapting field optical system allows the subject to be preadapted to various luminance levels before the flash is received. The criterion measure for recovery times following the flash was the correct identification of Sloan–Snellen test letters. Five different letter sizes were provided subtending visual angles from 41.9 to 10.2 minutes of arc. Some data are reported for five exposure durations of the flash and for five field sizes for the 20.3 minutes of arc test letter at a luminance of 0.0666 ml. Author

N64-33366 California U., Santa Barbara
ADAPTATION OF MAN TO COLD ENVIRONMENTS Annual Progress Report, Sep. 1963–Sep. 1964
Steven M. Horvath [1964] 5 p
(Contract DA-49-193-MD-2202)
(AD-444482)

The objectives and methods of the following experiments are discussed; (1) reactions of young male subjects to an ambient environment of 6° to 8° C; (2) determination of the influence of workloads of varying intensity on the ability of

subjects to maintain thermal balance in a cold environment; (3) effects of long-term, 12-hour work or lying exposures at 6° to 8° C; (4) study of surfers and nonsurfers in an investigation of local acclimatization development; (5) adaptation of swimmers to cold; (6) control experiments on long-term (8-hr) work with modification of feeding patterns; and (7) use of combinations of atmospheres to obtain concurrent information on thermal balances and on the psychological alterations. P.V.E.

N64-33391* National Aeronautics and Space Administration, Washington, D.C.

THE EFFECT OF WATER REMOVAL AND ABSORPTION ON METABOLISM DURING HUNGER [UBER DEN EINFLUSS VON WASSERENTZIEHUNG UND WASSERAUFNAHME AUF DEN STOFFWECHSEL BEIM HUNGERN]

W. Axenoff Sep. 1964 9 p refs Transl into ENGLISH from Z. Biol. (Munich), v. 90, 1930 p 50-56

(NASA-TT-F-9106) OTS: $1.00 fs; $0.50 mf

In order to determine the relationship between water balance and nitrogen metabolism, a research program was designed to observe a long series of fasting days while comparing periods of complete dehydration and of moderately elevated water intake (to 1700 cc). Results showed that water retention and intake affect the nitrogen and uric acid in the urine even when urine volume is unchanged, while sodium chloride, ketonuria, and ammonia secretion are not affected. Body weight shows increases corresponding to water intake and limited by water retention. E.C.

N64-33392* National Aeronautics and Space Administration, Washington, D.C.

COMPARATIVE EFFECT OF DISTILLED WATER, VICHY WATER AND EQUIMOLECULAR SOLUTIONS IN EXPERIMENTAL AQUEOUS PLETHORA [ACTION COMPAREE DE L'EAU DISTILLEE, DE L'EAU DE VICHY ET DES SOLUTIONS EQUIMOLECULAIRES DANS LA PLETHORE AQUEUSE EXPERIMENTALE]

Maurice Chiray, L. Justin-Besancon, Charles Debray, and Maurice Lacour Sep. 1964 8 p refs Transl. into ENGLISH from Bull. Acad. Med. (Paris), v. 121, no. 11, 1939 p 416-421

(NASA-TT-F-9108) OTS: $1.00 fs; $0.50 mf

The methods used to produce water intoxication and the principal symptoms observed are briefly presented. Rabbits and dogs were subjected to water intoxication from both distilled and Vichy water. In the rabbits the fatal intravenous dose per kilogram of body weight rose from 69 cc in the case of distilled water to 672 cc for Vichy water; when the gastric route to intoxication was used, the dose rose from 281 cc to 1314 cc, respectively. In the dogs the dose rose from 117 (distilled water) to 500 cc (Vichy water) when the intravenous method of inducing intoxication was used. From the results, it is concluded that the biological properties of water affect appreciably the results obtained in experimental aqueous plethora, and the qualitative factor must be placed among the causes of water intoxication (i.e., the quantity of liquid introduced and its molecular concentration must be considered equally). P.V.E.

N64-33393* National Aeronautics and Space Administration, Washington, D.C.

DISTURBANCE OF OSMOTIC TISSUE REGULATION IN WATER INTOXICATION [DIE STORUNG DER OSMOREGULATION DER GEWEBE BEI DER WASSERVERGIFTUNG]

Paul Gomori and Stephan Molnar Sep. 1964 10 p refs Transl. into ENGLISH from Arch. Exp. Path. Pharmak. (Leipzig), v. 167, 1932 p 459-468

(NASA-TT-F-9110) OTS: $1.00 fs; $0.50 mf

Experimental work of Kerpel-Fronius and Leovey is discussed briefly. Rowntree's conclusion, that it is not the amount of water administered, but the quantity assimilated that is decisive, was cited. He further stated that injection of hypertonic sodium chloride solution prevents toxic symptoms or reverse existing intoxication. This paper reports experiments done on rabbits to determine whether osmotic tissue concentration has a lower limiting value beyond which, in the opposite direction, vital functions are inhibited. The lower viability threshold of osmotic tissue concentration corresponds to that of the 0.60° C freezing point depression (measured by Sabbatini's method) occurring in the brain, liver, and muscle. The conclusion is justified that osmotic tissue concentration has a strictly circumscribed lower threshold value. In water intoxication the animals do not die of increased intracranial pressure, but from severe disturbances in osmotic tissue regulation. E.C.

N64-33394* National Aeronautics and Space Administration, Washington, D.C.

THE EFFECT ON THE ORGANISM OF THE INTRODUCTION OF LARGE QUANTITIES OF WATER [UBER DIE WIRKUNG DER ZUFUHR GROSSER WASSERMENGEN AUF DEN ORGANISMUS]

Kunstmann Sep. 1964 20 p refs Transl. into ENGLISH from Arch. Exptl. Pathol. Pharmakol. (Berlin), v. 170, 1933 p 701-718

(NASA-TT-F-9111) OTS: $1.00 fs; $0.50 mf

With intake of very large quantities of liquid over long periods (127 days), a large sodium chloride loss took place in the organism without loss of water. There is no increased nitrogen elimination. The molar concentration of the blood increases, as does that of sodium chloride in the serum. An increased craving for liquid appears and remains after the end of the test. This increased craving for liquid appears to be conditioned by the loss of sodium chloride. In the course of the test a disturbance of the sodium chloride elimination was established that was noticeable both in the thirst test and with sodium chloride loading. This disturbance does not lie in a change in the kidney function, but depends on the chlorine impoverishment of the organism. Author

N64-33395* National Aeronautics and Space Administration, Washington, D.C.

WATER AND INORGANIC METABOLISM DURING INSULIN TREATMENT OF DIABETICS. STUDIES IN INSULIN EDEMA [UBER DEN WASSER- UND MINERAL STOFFWECHSEL WAHREND DER INSULINBEHANDLUNG DER DIABETIKER. STUDIEN UBER DAS INSULINODEM]

Eskil Kylin Sep. 1964 11 p refs Transl. into ENGLISH from Z. Ges. Exptl. Med. (Heidelberg), v. 63, 1928 p 606-615

(NASA-TT-F-9112) OTS: $1.00 fs; $0.50 mf

During insulin treatment of diabetics the following situation exists: (1) Water retention is particularly evident during the first days of insulin treatment. Later, the water can be flushed out even during insulin treatment. After its discontinuance the retained water is again eliminated. (2) Both blood thickening and blood thinning can be found during the first days of insulin treatment. (3) During insulin treatment the blood calcium level drops, and the blood sodium level rises. The potassium level does not seem to be affected uniformly. (4) During the water-retention phase, urine excretion of sodium and chlorine is reduced. Chlorine and sodium content in the urine increases during flushing of the retained water. Sodium secretion is much greater than that of chlorine. Author

N64-33396* National Aeronautics and Space Administration, Washington, D.C.

THE ASSIMILATION OF LARGE SUDDENLY INGESTED QUANTITIES OF LIQUID [DIE BEWALTIGUNG EINMALIG ZUGEFUHRTER GROSSER FLUSSIGKEITSMENGEN]

F. Reiche Oct. 1964 9 p Transl. into ENGLISH from Med. Klin. (Munich), v. 27, no. 10, 1931 p 347–349
(NASA-TT-F-9114) OTS: $1.00 fs; $0.50 mf

Experimental data are presented in an attempt to evaluate the physiological effects of sudden ingestion of large quantities of water. Preabsorptive values and determinations of water concentration of the blood, as well as of chlorides and urea were made. Four groups were studied to determine to what extent copious doses of liquid might affect the heart though an increase in blood water content and, thus, in blood volume. E.C.

N64-33397* National Aeronautics and Space Administration, Washington, D.C.

WATER INTOXICATION AND WATER DIURESIS IN ADRENAL INSUFFICIENCY AND THE SIGNIFICANCE OF THE ADRENAL GLAND IN OSMOREGULATION ["WATER INTOXICATION" UND WASSERDIURESE BEI DER NEBENNIERENINSUFFIZIENZ; DIE BEDEUTUNG DER NEBENNIERE FUR DIE OSMOREGULATION]

R. Rigler Sep. 1964 4 p refs Transl. into ENGLISH from Klin. Wochschr., v. 14, no. 7, 1935 p 227–228
(NASA-TT-F-9115) OTS: $1.00 fs; $0.50 mf

Experiments carried out on adult rabbits, rats, and mice, whose adrenal glands in some cases had been removed, are described. Results reported include a marked increase in water excretion in the animals without adrenal glands when charged with triple hypertonic salt solution, the osmotic ineffectiveness of glycol after absorption, and the evident renal insufficiency in mice with absent adrenal glands and an overcharge of water. D.E.W.

N64-33398* National Aeronautics and Space Administration, Washington, D.C.

EFFECT OF COPIOUS WATER INTAKE ON THE ORGANISM [UBER DIE WIRKUNG DER AUFNAHME GROSSER WASSERMENGEN AUF DEN ORGANISMUS]

Herman Strauss Sep. 1964 9 p refs Transl. into ENGLISH from Klin. Wochschr. (Berlin), v. 1, no. 26, 1922 p 1302–1305
(NASA-TT-F-9116) OTS: $1.00 fs; $0.50 mf

The kidneys perform according to the intake. After fluid intake decreases, urine volume immediately drops. In this connection renal water secretion can occasionally be temporarily increased. Increased sodium-chloride secretion occurs. Occasionally this results in the elevation in osmotic blood pressure emphasized by Veil. During the increased water intake, blood thinning and considerable anemia appear, and outlast the drinking period. Manifestations of water impoverishment of the body, which would permit comparison with the polydipsia of diabetes insipidus, are lacking. Author

N64-33399* National Aeronautics and Space Administration, Washington, D.C.

PHYSIOPATHOLOGY OF WATER AND SALT METABOLISM AND FLUID REGIMEN OF WORKERS IN OVERHEATED INSTALLATIONS [DIE PATHOPHYSIOLOGIE DES WASSER- UND SALZSTOFFWECHSELS BEI ARBEITERN IN UBERHITZTEN WERKSTATTEN UND DAS TRINKREGIME]

A. Raschewskaja Sep. 1964 13 p refs Transl. into ENGLISH from Arch. Gewerbepath. Gewerbehyg. (Berlin), v. 3, 1932 p 830–839
(NASA-TT-F-9120) OTS: $1.00 fs; $0.50 mf

The mechanism of NaCl deprivation is explained by laboratory tests as blood-thickening concurring simultaneously with the absolute and percentile decrease of natrium chloride in the body fluids. Some case samples are observed. The displacements in the water–salt exchange were verified by tests for polyglobulia, elevated hemoglobin content, leucocytosis, sharply elevated protein content, increase in viscosity, and in the blood calcium and sugar content. The importance of introducing salt at regular intervals into the fluid regimen during work in an overheated room is pointed out. G.G.

N64-33400* National Aeronautics and Space Administration, Washington, D.C.

BIOCHEMICAL CHARACTERISTICS OF ECLAMPTIC CONVULSIONS AND EXPERIMENTAL REPRODUCTION OF ECLAMPTIC INTOXICATION [LES CARACTERISTIQUES BIOCHIMIQUES DES CONVULSIONS DE L'ECLAMPSIE ET LA REPRODUCTION EXPERIMENTALE DE L'INTOYICATION ECLAMPTIQUE]

J. L. Wodon (Brussels U.) Sep. 1964 11 p refs Transl. into ENGLISH from Rev. Franc. Gynecol. Obstet. (Paris), v. 29, 1934 p 863–872
(NASA-TT-F-9121) OTS: $1.00 fs; $0.50 mf

Values of pH of the blood and of the alkaline reserve at and shortly after delivery are discussed along with a graph for both normal primiparas and eclamptics. The statement that eclampsia is a posterior pituitoxicosis is examined, and experiments on dogs are described. The dogs were treated with excesses of water alone, to produce water intoxication, and with water excesses in addition to IM injections of posterior pituitary extract. Convulsive reactions are described along with the accompanying pH and alkaline reserve changes. Because of several differences in the blood condition in human eclamptics, the experimental results are stated to constitute an objection to the idea that eclampsia is a simple water intoxication or an intoxication caused by a posterior pituitary-secretion product. D.E.W.

N64-33401* National Aeronautics and Space Administration, Washington, D.C.

WATER INTOXICATION [UBER WASSERINTOXICATION]

M. Yoshida Sep. 1964 8 p refs Transl. into ENGLISH from Japan Med. World, v. 9, no. 11, 1929 p 335–338
(NASA-TT-F-9125) OTS: $1.00 fs; $0.50 mf

The results of some water intoxication experiments are presented. In the experiments with rabbits, 50 cc of water for each kilogram of body weight were introduced directly into the stomach by gastric tube every half hour. The experiments investigated the following: erythrocyte and hemoglobin resistance; the sedimentation rate of the erythrocytes; the carbon dioxide content of the blood plasma; the H-ion concentration of the blood plasma; the percent of oxygen saturation of hemoglobin; the anatomical and histological changes in the internal organs; hemoglobinemia; and the causes of death. P.V.E.

N64-33402* National Aeronautics and Space Administration, Washington, D.C.

DANGER CAUSED BY RADIATION IN THE BEAMS AND BEAM ZONES OF THE SYNCHROCYCLOTRON [DANGERS DUS AUX RADIATIONS DANS LES FAISCEAUX ET LES ZONES DE FAISCEAUX AU SYNCHROCYCLOTRON]

J. Baarli Oct. 1964 6 p Transl. into ENGLISH from the Report of the MSC (Synchrocyclotron Machine) Meeting, 21 Jun. 1963

(NASA-TT-F-9136) OTS: $1.00 fs; $0.50 mf

The danger caused by synchrocyclotron radiations varies with the nature of the beams, their intensities, particle energies, and the extent of scattering. The biological effects and damage due to radiations are discussed, and dose limits are defined. The maximum permissible particle flux is given for various regions in the proton and neutron rooms for 600-MeV protons, 400-MeV neutrons, 50 MeV π^--mesons, and μmesons. D.S.G.

N64-33407* National Aeronautics and Space Administration, Washington, D.C.

ARTIFICIAL FOOD PRODUCTS AND ASTRONAUTICS [SZTUCZNE SRODKI SPOZYWCZE I ASTRONAUTYKA]

Ignacy Grundland Oct. 1964 17 p refs Transl. into ENGLISH from Astronautyka (Warsaw), v. 6, May 1963 p 21–24

(NASA-TT-F-9146) OTS: $1.00 fs; $0.50 mf

The energy requirements of the individual and of the Earth's population are analyzed in relation to both the available food supply and the ultimate sources of the solar energy that is transformed by plants and algae. The requirements and productivity of photosynthesis are discussed, along with the degradative processes that complete the cycle, and the possible uses of algae are described, with special attention to the characteristics of *Chlorella pyrenoidosa* and *scenedesmus*. It is pointed out that chemical synthesis of foodstuffs may well become important, as a supplement to photosynthesis, not only for space exploration but to feed the Earth's burgeoning population. Author

N64-33408* National Aeronautics and Space Administration, Washington, D.C.

A STUDY OF THE MECHANISM OF THE PAIRWISE ACTIVITY OF THE VESTIBULAR APPARATUS [K IZUCHENIYU MEKHANIZMA PARNOY RABOTY VESTIBULYARNOGO APPARATA]

G. I. Gorgiladze Oct. 1964 12 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 158, no. 2, 1964 p 488–491

(NASA-TT-F-9147) OTS: $1.00 fs; $0.50 mf

Electrophysiological techniques are used to study the mechanism of action of the vestibular apparatus, and the reciprocal interconnections between the semicircular canals and the vestibular nuclei in the medulla oblongata. Electrocorticograms recorded in curarized cats showed that cathode polarization of the ipsilateral labyrinth increased the activity of most vestibular neurons, as did anode polarization of the contralateral labyrinth. Further experiments indicate that the block in vestibular afferentation preventing EEG changes during equal polarization of both labyrinths is localized in the vestibular nuclei themselves and not in the reticular formation. The usual reciprocity between the neurons of the vestibular nuclei on the right and left sides, which is increased by binaural polarization, is disrupted by equal polarization in three different ways. These three possible mechanisms are outlined, and a schematic representation of the interconnections between the vestibular nuclei is proposed. Author

N64-33410* National Aeronautics and Space Administration, Washington, D.C.

ADAPTABILITY OF HUMANS TO VARIOUS KINDS OF STRESS IN RELATION TO MANNED SPACE FLIGHT [ZUM PROBLEM DER ANPASSUNG DES MENSCHEN AN VERSCHIEDENARTIGE BELASTUNGEN IN HINSICHT AUF DIE BEMANNTE RAUMFAHRT]

K. E. Klein, H. Bruner, D. Jovey, and H. M. Wegmann Nov. 1964 20 p refs Transl. into ENGLISH of a paper presented at the Ann. Conv. of the Wiss. Ges. für Luft- und Raumfahrt, Munich, 8–12 Oct. 1963

(NASA-TT-F-9158) OTS: $1.00 fs; $0.50 mf

Recent findings in the adaptation of man and animals to typical stress conditions encountered in space flight (altitude, heat, cold, physical exertion, acceleration, radiation) are briefly surveyed, with emphasis on research on humans at high altitudes. Differentiation is made between specific responses to a particular stimulus and the more general nonspecific responses elicited uniformly by several kinds of stimuli. Current knowledge on "cross adaptation" and its product, cross resistance, is summarized in tables. The comparative merits of prolonged conditioning to stress versus intermittent exposure are evaluated. Author

N64-33452* Minnesota U., Minneapolis Medical School

17-KETOSTEROID AND VOLUME OF HUMAN URINE

Franz Halberg and Christian Hamburger Repr. from Minn. Med., v. 47, Aug. 1964 p 916–925 refs

(Grants NsG-517; PHS-5-K6-GM-13,981; PHS-NB-04531-02; PHS-C-4359(C4); Am. Cancer Soc.-E-155E)

Changes in human 17-ketosteroid excretion with a frequency of 1 cycle per week were found in long and reliable series of data. The analyses of a relatively large quantity of information were speedily and accurately accomplished by electronic computer. The physiologic changes detected by complex numerical operations are not readily apparent from inspection of the data. The changes may be called near rhythms. Their regularity compares unfavorably with that of any well-known physiologic rhythm. The amplitude of these near rhythms is small. Their statistical significance is high, and their biologic importance is now amenable to study. Author

N64-33453* Texas U., Dallas Southwestern Medical School

GRAVITY, RADIATION AND GROWTH

P. O'B. Montgomery, Eugene Rosenblum, and Betty Stapp Repr. from Aerospace Med., v. 35, no. 8, Aug. 1964 p 731–733 refs

(Grant NsG-210-63; Contract AT-(40-1)-2478)

Phage-free *E. coli* B cells were exposed to continuous ionizing radiation from a cobalt-60 source that delivered 55.8 R per hour. Cells so treated show a depression of their growth curves when compared to unirradiated control cells. Ultrastructural observations indicate that these irradiated cells continue to enlarge despite their failure to divide. This enlargement involves the entire cell and its intracellular ultrastructural components. A comparison of these effects of X-radiation with the effects of increased gravity on these cells was made. It is apparent that increased gravity and increased X-radiation produce similar disturbances in the growth curves and in ultrastructural characteristics of *E. coli* B cells. The possibility that these alterations may be of a genetic nature is considered. Author

N64-33456* Rochester U., N.Y.

ENHANCEMENT OF THE PHOTOSYNTHESIS OF *CHLORELLA PYRENOIDOSA* AS A FUNCTION OF FAR-RED AND SHORT-WAVE ILLUMINATIONS

T. T. Bannister and M. J. Vrooman Repr. from Plant Physiol., v. 39, no. 4, Jul. 1964 p 622–629 refs

(Grant NsG-(T)-73)

Both E (the ratio of the rate of photosynthesis supported by far red in the presence of short waves to the rate supported by far red in the absence of short waves) and D (the excess photosynthesis rate generated in enhancement) were characterized as functions of far red and short wave illuminations. By reference to respiratory and saturated photosynthetic rates, the functions *E* and *D* were related to the illumination curve

of photosynthesis. The magnitude of *D*, which reached values as high as 0.04 of saturated rate, and the fact that *D* increased with illumination up to illuminations giving approximately 30% of saturated rate, demonstrated clearly that enhancement is photosynthetic and not due to light-induced respiratory inhibitions. The essential characteristics of the observed dependences of *E* and *D* on illumination are in accord with both the spill-over and separate-package hypotheses of enhancement, with the modifications that the distribution of short-wave quanta between the photoreactions is a continuous function of illumination, and light saturation of photosynthesis is taken into account. Author

N64-33459 Ohio State U. Research Foundation, Columbus
VISUAL RECOVERY FROM BRIEF EXPOSURES TO VERY HIGH LUMINANCE LEVELS, PART I Final Report
Norma D. Miller Brooks AFB, Tex., School of Aerospace Med. May 1964 78 p refs
(Contract AF 33(657)-9229)
(TDR-2; AD-450072)

Maximum flash field luminances of 5.4×10^5L were produced by a xenon-filled discharge tube seen by maxwellian view The field diameters were varied from 10° to 20 min of arc, and the flash exposures were varied from 0.04 msec to 1.4 msec. The maximum flash energy was 0.042 cal/cm^2 at the retina, neglecting losses in the ocular media. During most of the experimental work, the maximum flash energy was reduced to 0.012 cal/cm^2 at the retina by the use of an infrared blocking filter. The flash luminances were varied over a 30 to 1 range. The criterion measure for recovery times following the flashes was the correct identification of Sloan-Snellen test letters viewed as bright letters against a dark background. Author

N64-33485 Joint Publications Research Service, Washington, D.C.
MODELING IN LANGUAGE TEACHING AND PROBLEMS OF PROGRAMMED INSTRUCTION
30 Oct. 1964 13 p refs Transl. into ENGLISH from Vestn. Vysshey Shkoly (USSR), no. 7, 1964 p 31-35, 38-40
(JPRS-27166; TT-64-51422) OTS: $1.00

CONTENTS:

1. MODELING IN THE TEACHING OF FOREIGN LANGUAGES V. F. Nechiporenko p 1-4
2. SOME PROBLEMS OF PROGRAMMED INSTRUCTION IN THE LIGHT OF PSYCHOLOGY B. S. Alyakrinskiy p 5-10 refs

N64-33486 Joint Publications Research Service, Washington, D.C.
PROBLEMS IN HUMAN AND ANIMAL PHYSIOLOGY
20 Oct. 1964 65 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), no. 4, Jul.-Aug. 1964 p 450-458, 460-467, 469-474, 494-499, 508-514, 518-521, 554-557
(JPRS-26990; TT-64-51246) OTS: $3.00

CONTENTS:

1. ELECTRICAL ACTIVITY OF THE NEURONS OF THE VISUAL CORTEX OF THE RABBIT R. R. Velikaya p 1-12 refs
2. SENESCENCE AND ADAPTATION OF THE ORGANISM V.V. Frol'kis p 13-22 refs
3. THE PROBLEM OF THE INTEROCEPTION OF THE TONGUE V. O. Samoylov p 23-30 refs
4. EFFECT OF AN ULTRA-HIGH FREQUENCY FIELD AND CONVECTIONAL HEAT ON THE ESTRUAL CYCLE IN MICE S. F. Gorodetskaya p 31-38 refs
5. THE MECHANISM OF THE BIOLOGICAL ACTION OF ULTRASONIC VIBRATIONS M. I. Gurevich and S. A. Bershteyn 39-51 refs
6. RELATIONS BETWEEN PERIPHERAL MOTOR CHRONAXY AND THE MOBILITY OF THE BASIC NERVE PROCESSES IN THE HUMAN CEREBRAL CORTEX N. V. Kol'chenko p 52-57 refs
7. EFFECT ON THE ORGANISM OF PARTIAL WEIGHTLESSNESS DUE TO SUBMERSION IN WATER V. P. Dudarev and P. V. Beloshitskiy p 58-62 refs

N64-33495 Argentina. Comision Nacional de Energia Atomica, Buenos Aires
INFLUENCE OF THE pH OF THE CULTURE MEDIUM ON THE ABSORPTION OF $C^{14}O_2$ BY THE *CHLORELLA VULGARIS* [INFLUENCIA DEL pH DEL MEDIO DE CULTIVO EN LA ABSORCION DEL $C^{14}O_2$ POR LA *CHLORELLA VULGARIS*]
Leopoldo J. Anghileri 1964 8 p refs In SPANISH *Its* Informe No. 118

The influence of the pH of the culture medium on the development of *Chlorella vulgaris* and the possible variations in the metabolism of C-14 incorporated with CO_2 were studied. The preparation and composition of the medium are described. It is concluded that, under the given experimental conditions, the *Chlorella vulgaris* ceases its development at a pH of 10.0, but is, nevertheless, able to develop at a pH of 3.0. Apparently the *Chlorella vulgaris* is able to metabolize the C-14 present with HCO_3^- or with CO_2, since a high pH the $CO_3^=$ predominates completely. The values of the activity present in the hydrolyzate of proteins, reaching as high as 60%, can be excessively high because of the presence of activity proceeding from the hydrolysis of the cellulose and nonproteinic compounds.
Trans. by D.E.W.

N64-33496 Defence Research Board, Ottawa (Canada)
STUDY OF THE INFLUENCE OF ROTATORY STIMULATION UPON RESPIRATION
Masami Usami Sep. 1964 19 p refs Transl. into ENGLISH from J. Oto-Rhino-Laryngol. Soc. of Japan, v. 65, no. 5, 1962 p 662-671
(T-84-J)

Under rotatory stimulation, a prolonged expiration is seen in most cases. The labyrinthine respiratory changes bear a definite relation to the intensity of stimulation, since with increasing stimulation the latent period tends to shorten and the postrotatory duration tends to be prolonged. The labyrinthine respiratory changes evoked by rotatory stimulation are affected by the autonomic nervous system; generally speaking, under conditions of autonomic imbalance these changes are greater. The labyrinthine respiratory changes mirror the labyrinthine functional state, for when labyrinthine function is unilaterally depressed and the hypofunctional labyrinth is stimulated, the duration of the respiratory changes is shorter than with stimulation of the labyrinth on the intact side. When, simultaneously with the labyrinthine respiratory changes, the nystagmus and turning sensation also are recorded and the relations between the three phenomena are studied, the per-rotatory labyrinthine respiratory changes generally appear earlier than the per-rotatory nystagmus, and their duration is longer. D.E.W.

N64-33507 Princeton U., N.J.
A FIXED EFFORT SCHEDULE OF REINFORCEMENT
Maxwell A. Morfield (Ph.D. Thesis) May 1964 92 p refs
(Contract Nonr-1858(19))
(AD-607325)

The effects on conditioning performance and extinction of a Fixed Effort (FE) schedule of reinforcement were investigated. The major findings reported are that a decrease occurs in reinforcement rate as a function of the increased effort requirement per reinforcement; high effort requirements appear to have an inhibiting effect on effort per response; effort per reinforcement has no effect on resistance to extinction; the variability of effort per response increases significantly during extinction; there is a significant difference between the effort distributions of the differentiation animals and the FE animals; and a correlation was found between the direction and amount of change of effort per response from conditioning to extinction. D.E.W.

N64-33512* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUGUST 1963. PROCEEDINGS, VOLUME 1: CONTRIBUTED PAPERS
John A. Moore, ed. [1963] 334 p
(Grant NsG-364)
(NASA-CR-59306) OTS: $7.00 fs; $1.50 mf

Papers and abstracts are compiled that were presented at the Congress of Zoology. They comprise invertebrate zoology, the role of ectocrines in interactions of aquatic invertebrates, the biology of cephalopods, mucus in invertebrates, marine zoology, parasitology, vertebrate zoology, paleontology, systematics, zoogeography, ecology, and scientific demonstrations. Papers are presented in various languages, including English, French, Spanish, and Russian. D.E.W.

N64-33513* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUGUST 1963. PROCEEDINGS, VOLUME 2: CONTRIBUTED PAPERS
John A. Moore, ed. [1963] 348 p
(Grant NsG-364)
(NASA-CR-59307) OTS: $7.00 fs; $1.75 mf

This is a collection of abstracted papers pertaining to "Behavior (invertebrates)"; "Behavior (vertebrates)"; "Physiology"; "Functional Anatomy and Physiology of Molluscs"; "Endocrinology"; "Evolution"; "Genetics"; "Embryology"; and "Cell Biology." G.G.

N64-33514* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUGUST 1963. PROCEEDINGS, VOLUME 3: SPECIALIZED SYMPOSIA
John A. Moore, ed. [1963] 431 p refs
(Grant NsG-364)
(NASA-CR-59305) OTS: $7.31 fs; $2.00 mf

This report contains a number of abstracts covering the following objectives: "Endocrine Mediation in Social Adjustments of Vertebrates and Invertebrates"; "The Evolution of Endocrine Systems"; "Behavioral Adaptations of Mammals to Environments"; "Invertebrate Chemoreception"; "The Physiology of Echinodermata"; "The Biology of Gnotobiotic Animals"; "Specific Inhibition During Development"; "Nucleo-Cytoplasmic Interrelations"; "Recent Advances in Neuroanatomy"; "Principles and Problems of Functional Morphology"; "Evolution of Higher Levels of Organization"; "Evolution at the Population and Interpopulation Levels"; "The Regulation of Numbers in Natural Populations"; "Recent Advances in Simian Malaria"; and "Scientific Use of Natural Areas." G.G.

N64-33515* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUG. 1963. PROCEEDINGS, VOLUME 4: SPECIALIZED SYMPOSIA
John A. Moore, ed. [1963] 396 p refs
(Grant NsG-364)
(NASA-CR-59304) OTS: $7.00 fs; $1.75 mf

This report contains a number of papers covering the following objectives: "The Fauna of North America, Its Origin and Unique Composition"; "Mammalian Evolution on the Southern Continents"; "Evolution of Man"; "New Techniques for Systematics"; "Mimicry"; Biology of Blood Protozoa"; "Insect Development and Endocrinology"; "Chromosome Structure and Function", "The Deep Scattering Layer"; "The Biology of Abyssal Animals"; "Biological Productivity at the Heterothropic Levels"; "Ecological and Evolutionary Aspects of Biological Clocks"; "The Ontogeny of Basic Response Patterns"; and "Animal Navigation." G.G.

N64-33524 Kentucky U., Lexington
THE EFFECTS OF IMMERSION OF THE HAND IN COLD WATER ON DIGITAL BLOOD FLOW
A. C. L. Hsieh, T. Nagasaka, and L. D. Carlson Fort Wainwright, Alaska, AFSC, Arctic Aeromed. Lab., Mar. 1964 14 p refs
(Contract AF 41(657)-335)
(AAL-TDR-63-35; AD-607603)

The temperatures of the tip of the middle fingers (T_s) of 9 comfortably warm subjects was recorded during immersion of all the fingers of one hand in a 27-liter bath containing slowly stirred water at temperatures ranging from 4.6° to 40° C (T_w). Blood flow ($F = ml/cm^2/min$) was estimated from the average T_s for the last 15 minutes of a 20-minute period, and T_w and body temperature (T_b) by using the equation $F = 1087 \times K(T_s - T_w)$, where $K = 0.0134$ kcal/cm^2/min/°C. The increase in F per °C reduction in T_w below 10°C was 0.16 $\pm$0.077 ($P < 0.05$). This value gives a measure of the vasodilatation occasioned by immersion in water below 10° C. The sample regression equation of F on T_w was $F = 4.1 - 0.16\,T_w \pm 0.17$, where $n = 27$ and the range of T_w = 4.6° to 10° C. This method of estimating blood flow at several levels of T_w describes more fully the peripheral circulatory response to cold than methods in which only one level of T_w is used. Author

N64-33530 Air Force Systems Command, Wright-Patterson AFB, Ohio Aerospace Medical Research Labs.
MAN'S VERTICAL ACCELERATION WHILE CROUCHING
Donald D. Mueller Aug. 1964 12 p ref
(AMRL-TDR-64-56; AD-607044) OTS: $0.50

The vertical accelerations involved in crouching and returning to the erect position were computed from the measured forces applied by the subject's feet to a force plate. The subjects were instructed to squat, retrieve an object from the floor, and return to the erect position in a normal manner. The average peak accelerations were found to range from 0.118 to 0.166 g. If an astronaut's acceleration pattern is the same under weightlessness, a restraint system or device capable of holding with a force equal to at least one-third the astronaut's earth weight will be required to prevent his feet from leaving the floor when crouching and to prevent launching himself away from the floor when arising from a crouched position. Author

N64-33536 Boeing Co., Seattle, Wash. Aerospace Div.
IDENTIFICATION OF OBLIQUE FORMS Final Report
C. L. Klingberg, C. L. Elworth, and C. L. Kraft Griffiss AFB, N.Y., RADC, Aug. 1964 139 p refs
(Contract AF 30(602)-2965)
(RADC-TDR-64-144; AD-607357)

Accuracy of form recognition was determined for 45 observers who viewed photographic slide projections of nine military-type targets (three each of ships, airplanes, ground vehicles). The views represented in the imagery included five oblique viewing angles and five orientations (compass directions). They were displayed at three levels each of exposure time, image quality (blur), contrast, and scale ratio. Tests of the statistical significance of the differences in performance as a function of changes in oblique angle of view, orientation of target (with respect to compass direction), image quality, luminance contrast, and exposure time revealed that each main effect was significant ($p < 0.05$) for at least eight of the nine target-class–scale-ratio combinations. One interaction, obliquity x orientation, was significant ($p < 0.01$) for all nine combinations. Only 10 of the remaining 81 interactions were significant. Author

N64-33570 Naval School of Aviation Medicine, Pensacola, Fla.
THE EVALUATION OF PHYSIOLOGICAL SYNCOPE IN AVIATION PERSONNEL
Laurence H. Blackburn, Jr. 1 Jul. 1964 22 p refs
(Rept.-16; AD-449817)

Evaluation of syncope in aviation personnel frequently fails to consider physiological causes or hypersensitive responses to physiological acts. The incidence and causes of these types of syncope are discussed, and the experience with syncope is analyzed. A protocol is formulated for the complete, standardized examination of each episode of syncope, and general principles for the proper disposition of syncopal aviators are developed. Author

N64-33577 Joint Publications Research Service, Washington, D.C.
TRANSLATIONS ON RADIATION THERAPY
3 Nov. 1964 74 p refs Transl. into ENGLISH from Med. Radiol. (Moscow), v. 9, no. 7, Jul. 1964
(JPRS-27203; TT-64-51458) OTS: $3.00

CONTENTS:

1. DETERMINATION OF CARDIAC VOLUME AND OTHER INDICES OF CENTRAL CARDIAC HEMODYNAMICS WITH THE AID OF RADIOACTIVE KRYPTON (Kr85) F. F. Kaperko p 1–15 refs

2. MECHANISM OF FUNCTIONAL AND MORPHOLOGICAL CHANGES OF THE KIDNEYS IN RATS TREATED WITH UNITHIOL FOR RADIATION SICKNESS (Po210) A. I. Poluboyarinova and V. N. Strel'tsova p 16–25 refs

3. UTILIZATION OF A COMPLEX COBALT COMPOUND (Co-30) DURING GENERAL REACTIONS ACCOMPANYING RADIATION THERAPY D. M. Abdurasulov, A. I. Nikolayev, and G. S. Ikramova p 26–31 refs

4. CORRELATION OF SOME EFFECTS (BLASTOMOGENIC, TUMOFACIENT AND LIFE SHORTENING) DURING THE ACTION OF IONIZING RADIATION R. V. Smirnov p 32–40 refs

5. CLINICAL PECULIARITIES OF ACUTE RADIATION SICKNESS IN MONKEYS PREVIOUSLY IMMUNIZED WITH BCG VACCINE N. V. Rayeva, N. N. Klemparskaya, and I. N. Usacheva p 41–54 refs

6. CHANGES IN THE CARDIOVASCULAR SYSTEM UNDER THE INFLUENCE OF AMINOTHIOLS L. I. Tank and V. I. Kuznetsov p 55–69 refs

7. FOURTH INTERINSTITUTE CONFERENCE ON PROBLEMS OF RADIATION MICROBIOLOGY AND IMMUNOLOGY D. R. Kaulen p 70–76

N64-33578 Joint Publications Research Service, Washington, D.C.
FURTHER EXPERIMENTS ON CHEMOTHERAPY IN THE TREATMENT OF RADIATION SICKNESS
M. A. Tumanyan and A. V. Izvekova 4 Nov. 1964 8 p refs Transl. into ENGLISH from Antibiotiki (Moscow), v. 9, no. 8, Aug. 1964 p 719–722
(JPRS-27220; TT-64-51475) OTS: $1.00

This study describes the development of chemotherapy charts for infectious complications of radiation sickness. By the appearance of antibiotic-resistant microflora in irradiated and treated apes, a sharp drop in the effectiveness of the chemotherapy took place. It was concluded that the chemotherapy results depend significantly on the formation of antibiotic-resistant forms of bacteria of the autoflora. The antibiotics phenoxypenicillin, mycerin, monomycin, and also sulfamide phthalazine gave the best results in survival rates of rabbits and rats exposed to lethal radiation doses. G.G.

N64-33582 Atomic Energy Commission, Washington, D.C. Div. of Technical Information
RADIATION AND CHEMICAL PROTECTION
Evgenii Fedorovich Romantsev Nov. 1963 253 p refs Transl. into ENGLISH of the book "Radiatsiya i Khimicheskaya Zashchita" Moscow, Gosatomizdat., 1963 204 p
(AEC-TR-6258) OTS: $6.00

The current status of the problem of protecting organisms from penetrating radiation by using internally administered chemicals is presented. Subjects covered include primary physicochemical processes in the action of radiation, bases of the search for chemical protective agents, radiation and the cellular microstructure, chemical protection of sulfur-containing amino acids and glutathione, prophylactic and antiradiation effects of several specific agents, and chemical protective agents that increase the radioresistance of organisms. D.E.W.

N64-33604 General Electric Co., Philadelphia, Pa. Space Sciences Lab.
CLOSED ECOLOGIES FOR MANNED INTERPLANETARY FLIGHT
J. J. Konikoff Oct. 1963 40 p refs Presented at AIAA Meeting on Eng. Probl. of Manned Interplanet. Exploration, Palo Alto, Calif. 1 Oct. 1963
(R63SD83; AD-423218)

This report describes two ecological systems for the support of man during long-term space flight. The first system uses the methods of physical chemistry to recover water, maintaining oxygen and CO_2 balance from a simplified waste management system. Food is prestored. The second system utilizes the photosynthetic mechanism to produce food with the concomitant balance of oxygen and carbon dioxide. Wastes are disposed of in a modified activated sludge treatment tank that forms one-half of a biochemical fuel cell such that a capability exists for the production of small but significant amounts of electric energy. Author

N64-33662 Istituto di Ricerche Farmacologiche (Mario Negri), Milan (Italy)
ANTISEROTONIN AGENTS First Quarterly Technical Status Report, 1 Feb.–30 Apr. 1964
Silvio Garattini [1964] 15 p refs
(Contract DA-91-591-EUC-3233)
(AD-447846)

Progress in the following studies is briefly discussed: (1) "Effects of Antiserotonin Drugs on Gastrointestinal Propulsion"; (2) "Effect of Drugs on the Bronchoconstriction Produced by Serotonin in Guinea Pigs"; and (3) "Effects of Drugs on the Antidiuretic Effect Produced by Serotonin." P.V.E.

N64-33669 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
WORKING DAY OF A SPACE PIONEER. YA. G. GAGARIN RE-ENTERS SPACE TRAINING
V. Belikov 31 Mar. 1964 7 p Transl. into ENGLISH from Izvestiya (USSR), 9 Aug. 1963 p 4
(FTD-TT-64-149/1+4)

This is a description of a working day of the Russian astronaut Gagarin upon his reentry into space training. Several parachute jumps from a practice tower and one parachute jump from a plane are described. G.G.

N64-33675 Joint Publications Research Service, Washington, D.C.
POLAROGRAPHY IN MEDICINE AND BIOLOGY
I. T. Shevchenko and V. I. Gorodyskiy 5 Nov. 1964 45 p Transl. into ENGLISH from Polyarografiya v Meditsine i Biologii, (Kiev), 1964 p 5–6; 81–121; 133–134
(JPRS-27237; TT-64-51492) OTS: $2.00

Polarography, based on the principle that current power is proportional to the concentration of electrolytically reacting substances, is convenient for determination of cations, anions, hormones, amino acids, vitamins, and carbohydrates. Since improvement or deterioration in the condition of a patient are reflected in the height of the polarographic wave of blood serum and its protein-free filtrate, the polarographic method may be used to follow the course of cancer in patients. The polarographic method is described, and experience using this method in cancer studies over a number of years is documented. M.P.G.

N64-33687* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUGUST 1963. VOLUME 7: SCIENCE AND MAN SYMPOSIUM, NATURE, MAN AND PESTICIDES
John A. Moore, ed. 1964 50 p refs
(Grant NsG-364)
(NASA-CR-59303) OTS: $2.00 fs; $0.50 mf

The symposium discussed the following topics: (1) "Man, Food and Insects as an Ecological Problem"; (2) "Opportunities for the Development of Specific Methods of Insect Control"; (3) "Effect of Pesticides on Human Health"; and (4) "The Validity of Ecological Models." P.V.E.

N64-33689 California U., Los Angeles Biotechnology Lab.
UPPER EXTREMITY PROSTHETICS RESEARCH. HUMAN TRACKING SENSORY MOTOR CONTROL
John Lyman 15 Jun. 1964 30 p
(Contracts N-123(60530)-32857A; VA-V1005p-9779; Grant VRA-RD-1201M-64)
(Rept.-64-30; AD-605240)

This program report contains brief resumes on the following: "Upper Extremity Prosthetics Research"—needs analysis for development of externally powered protheses design specifications, analysis of existing externally powered prostheses, and development of advanced design specifications; "Research on Sensory-Motor Control"; and "Research on the Performance of the Human Operators of Tracking Systems"—performance evaluation of variables of the optical system on the NOTS tracking simulator. G.G.

N64-33690 California Coll. of Medicine, Los Angeles
STUDIES IN NIGHT VISION Third Interim Technical Report, 25 Mar.–25 Jun. 1964
Barbara B. Brown et al [1964] 72 p refs
(Contract DA-44-009-AMC-367(T))
(AD-447092)

The approaches employed in drug development programs, along with time and cost estimates, are discussed. Some specific synthetic chemical approaches are suggested. The survey of literature continued. The present portion of the survey covers the psychologic and physical aspects of perception that are important considerations for establishing tests for perceptual ability by which either drug evaluations or personnel selections can be made. In the experimental work an objective technique has been developed by which ability for visual recall can be quantified. This technique may permit selection of individuals with rapid and accurate recall ability. Additional data suggest that the same test may identify individuals with high visual ability in a red light environment. Author

N64-33761 Joint Publications Research Service, Washington, D.C.
INFORMATION FOR SPORTSMEN ON SENSE ORGANS
A. A. Berzin 3 Nov. 1964 54 p Transl. into ENGLISH of the book "Sportsmenam ob Organakh Chuvstv" Moscow, Izd. "Fizkul'tura i Sport", 1964 p 1–70
(JPRS-27192; TT-64-51447) OTS: $3.00

Examples are given to illustrate the nature of the sensations that arise in the course of performing physical exercises, i.e., in perceiving the movements of one's own body. In addition, the various sense organs or analyzers are briefly described. The musculomotor analyzers; the tactile, temperature, and pain analyzers; the organic analyzers; the vestibular analyzer; the auditory analyzer; and the visual analyzer are considered. It is concluded that the movements of a body cannot be perceived solely by means of one analyzer; however, at some phase of a movement, a specific analyzer (usually the musculomotor) emerges as the leading one. P.V.E.

N64-33854 Joint Publications Research Service, Washington, D.C.
DISTRIBUTION OF RADIOACTIVE CALCIUM AND ITS EXCRETION FROM THE BODIES OF HEALTHY AND LEAD-POISONED ANIMALS
K. K. Makashev and L. V. Kazachenko 13 Oct. 1964 9 p refs Transl. into ENGLISH from Izv. Akad. Nauk Kazakh. SSR (Alma-Ata), no. 1, 1964 p 50–55
(JPRS-26888; TT-64-51145) OTS: $1.00

Conclusions state that the poisoned rats excreted less radioactive calcium (^{45}Ca) than the rats of the control series; that the lower ^{45}Ca elimination in the poisoned rats was attributable to the feces, since the same quantity of calcium was

excreted in the urine in the normal and poisoned animals; and that the rate at which ^{45}Ca accumulated in the bone tissue was considerably higher in the poisoned rats. D.E.W.

N64-33855 Joint Publications Research Service, Washington, D.C.
TRAINING OF SCIENTISTS IN THE SOVIET UNION
N. Ye. Lyagushev et al 28 Oct. 1964 30 p Transl. into ENGLISH from Vestn. Vysshey Shkoly (USSR), no. 6, 1964 p 24–28, 39–40, 57–66
(JPRS-27116; TT-64-51372) OTS: $2.00

Three papers that concern training of scientists in the Soviet Union are presented: (1) "The Front of the Struggle for Technical Progress Is Widening"—a discussion of education in Soviet universities; (2) "An Important Day"—an outline of a student's day at the Institute of Radio Electronics and Mining Electromechanics; and (3) "What Should the Mathematics Course Be Like in a Higher Educational Institution?"—the development of a mathematical curriculum for higher educational institutes. P.V.E.

N64-33960 Joint Publications Research Service, Washington, D.C.
TRANSLATIONS ON COMMUNIST CHINA'S SCIENCE AND TECHNOLOGY NO. 119: PSYCHOLOGICAL RESEARCH ON THE USE OF VERBAL RESPONSE TO REPLACE MOTOR RESPONSE IN PERFORMING OPERATIONS WITH SIGNAL APPARATUS
30 Oct. 1964 7 p refs Transl. into ENGLISH from K'o Hsueh T'ung Pao (Peking), no. 9, Sep. 1964 p 820–821
(JPRS-27172; TT-64-51428) OTS: $1.00

The adoption of different modes of number naming as verbal responses to replace motor responses in the efficient performance of human operations is discussed and studied. Two modes of stimuli-response interactions were studied by signal lights arranged horizontally on a special panel. The choice reaction times to verbal responses and to electronic light responses were recorded. It was found that the operational performance was at its highest with the use of verbal responses at low frequency of the signals. Upon significant signal-frequency increase and a complex mode of number naming in the verbal response, the rate of gain of information began to decline. G.G.

N64-33875 Joint Publications Research Service, Washington, D.C.
EFFECT OF RADIATION ON NUCLEIC ACIDS
5 Nov. 1964 17 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 157, no. 4, 1964 p 975–981
(JPRS-27239; TT-64-51494) OTS: $1.00

This is a study of the relationship between the radiation resistance and the content of nucleic acids in *Escherichia coli* and in some of their variants that are resistant to different antibiotics. The sensitivity to X-rays was determined from dose curves that were exponential for all of the variants. The nucleic acid content was determined in the dry bacterial mass and calculated per cell. It was found that the increased radiation resistance was accompanied by an increased content in DNA and RNA. A positive relation between radiation resistance and nucleic acid content was established. G.G.

N64-33906* Naval School of Aviation Medicine, Pensacola, Fla.
REDEFINITION OF THE MACULA NEGLECTA IN MAMMALS Report No. 97
Makoto Igarashi and Samuel Lansdon 30 Jul. 1964 23 p refs Joint report with NASA
(NASA Order R-93)
(NASA-CR-59374) OTS: $1.00 fs; $0.50 mf

The rudimentary vestibular sensory end organ at the junctions of the utricle and semicircular canals was investigated in 70 mammalian ears, including those of man. The papillary or smooth epithelial thickening at the junction of the posterior crus of the lateral semicircular canal and the inferior utricular sinus, which has been called macula neglecta by many previous investigators, was observed in almost all of the human and dog specimens and in 25% of the squirrel monkeys. The term "epithelial mound of lateroposterior utricular fold" is recommended. In the cat and dog ears examined, but in none of the other mammals, the epithelial structure on the anterior medial wall of the inferior utricular sinus exhibited in almost all instances a stroma, blood supply, nerve supply, and specialized sensory epithelium. For this reason, the term "sensura neglecta" is suggested as an adequate one. Author

N64-33907 Ohio State U., Columbus Lab. of Aviation Psychology
AN APPLICATION OF BAYES THEOREM AS A HYPOTHESIS-SELECTION AID IN A COMPLEX INFORMATION-PROCESSING SYSTEM Technical Documentary Report, 15 Mar. 1963–31 Jan. 1964
Jack F. Southard, David A. Schum, and George E. Briggs Wright-Patterson AFB, Ohio, AMRL, Aug. 1964 68 p refs
(Contract AF 33(657)-10763)
(AMRL-TDR-64-51; AD-607256)

The first of a series of experiments investigating the value of automated hypothesis-evaluation aids in multiman–machine systems devoted to assessing or diagnosing threat is described. In the experiment, an eight-man team evaluated threats posed by a hypothetical aggressor. The team made these evaluations on the basis of intelligence information gathered during simulated reconnaissance overflights of aggressor's territory. IBM 1401 and 7090 computer facilities generated the highly complex, real-time stimulus environment (data base), which is described in detail. The primary output of the threat-evaluation team was the commanding officer's posterior probabilities estimates as to aggressor's most likely hostile strategies. During half of the experimental trials, the commander had access to computer produced posterior probabilities based upon a modification of the Bayes Theorem. The major experimental issue was whether or not these would aid the commander in his hypothesis evaluation. Also investigated was the effect of data-processing load upon system operation. Author

N64-33924* National Academy of Sciences—National Research Council, Washington, D.C.
XVI INTERNATIONAL CONGRESS OF ZOOLOGY, WASHINGTON, 20–27 AUGUST 1963. VOLUME 8: THE PROTECTION OF VANISHING SPECIES
John A. Moore, ed. 1964 45 p refs
(Grant NsG-364)
(NASA-CR-59027) OTS: $2.00 fs; $0.50 mf

CONTENTS:

1. EXTINCT, RARE AND ENDANGERED AMERICAN FRESHWATER FISHES Robert Rush Miller (Michigan U.) p 4–16 refs
2. THREATENED SPECIES OF MAMMALS IN NORTH AMERICA Ian McTaggart Cowan (Brit. Columbia U.) p 17–21
3. THREATENED BIRDS OF THE NEW WORLD S. Dillon Ripley (Smithsonian Inst.) p 22–24

4. VANISHING BIRDS OF THE OLD WORLD Jean Dorst (Museum Nat. d'Hist. Nat.) p 25–28

5. RARE AND THREATENED MAMMALS IN AFRICA Thane Riney (FAO/IUCN) p 29–32

6. VANISHING MAMMALS OF ASIA Harold J. Coolidge p 33–36

N64-33943 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.

MATERIALS ON THE TOXICOLOGY OF RADIOACTIVE SUBSTANCES

V. F. Zhuravlev and I. K. Petrovich 21 Sep. 1964 10 p Transl. into ENGLISH from Med. Radiol. (Moscow), v. 6, no. 12, 1963 p 81–83

(FTD-TT-64-599/1; AD-607120)

The introduction to a volume of 15 collected papers on the toxicology of Fe^{59} gives a brief critical review of the results reported in each of the papers. Topics covered include the effects of radioactive iron on the hemapoesis system, carbohydrate metabolism, cardiovascular system, central nervous system, and the morphology of organs and tissues. The individual papers are not included. M.P.G.

N64-33957 Joint Publications Research Service, Washington, D.C.

TRANSLATIONS FROM PRIRODA (NATURE), NO. 6, 1964

20 Oct. 1964 46 p Transl. into ENGLISH from Priroda (Moscow), no. 6, 1964 p 29–32, 56–64, 89–95, 119–124

(JPRS-26991; TT-64-51247) OTS: $2.00

CONTENTS:

1. THE ORIGIN AND EVOLUTION OF METABOLISM A. I. Oparin p 1–7

2. CLASSIFICATION AND SYSTEMATIZATION OF SCIENCE D. M. Troshin p 8–21

3. HYDRAULIC MEANS OF LOCOMOTION IN ANIMALS L. A. Zenkevich and V. S. Muraveyskaya p 22–32

4. SCIENTIFIC WRITINGS ABOUT THE UNIVERSE S. I. Smuglyy p 33–36

5. INTERACTION OF SCIENCES IN THE STUDY OF THE EARTH K. P. Florenskiy p 37–38

6. BOOK ON ARTS REVIEWED D. V. Panfilov p 39–41

7. EVOLUTION AND FRONTIERS OF THE PERIODIC SYSTEM Yu. Ya. Yakoulev p 42–44

N64-33961 Joint Publications Research Service, Washington, D.C.

IMMUNOLOGY RESEARCH IN THE USSR

9 Nov. 1964 30 p refs Transl. into ENGLISH from Zh. Mikrobiol. Epidemiol. i Immunobiol. (Moscow), v. 41, no. 9, 1964 p 76–80, 104–112, 144

(JPRS-27281; TT-64-51537) OTS: $2.00

CONTENTS:

1. THE EFFECT OF IRRADIATION ON THE PREVENTIVE PROPERTIES OF SERA FROM GUINEA-PIGS IMMUNIZED WITH LIVING BRUCELLA VACCINE Z. V. Shevtsova p 1–8 refs

2. THE STABILITY OF BIOLOGICAL PROPERTIES OF STRAIN STI-1 ANTHRAX VACCINE N. N. Ginsberg, R. A. Saltykov, and V. R. Arkhipova p 9–14 refs

3. WAYS TO IMPROVE THE QUALITY OF PROPHYLACTIC AND THERAPEUTIC PREPARATIONS A. T. Kravchenko p 15–25

4. IMMUNITY TO SMALLPOX IN VACCINATED CHILDREN FOUR AND EIGHT YEARS OF AGE I. M. Suslov p 26–27

N64-33970 Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.

MULTIPLE ELECTRODE IMPLANTATION INTO SUBCORTICAL STRUCTURES OF THE HUMAN BRAIN

K. V. Grachev 25 Mar. 1964 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 49, no. 9, 1963 p 1122–1125

(FTD-TT-63-1119/1+2+4; AD-435998)

Development and improvement of the methods used in implanting electrodes in the human brain are discussed. A multiple deep electrode mounted in the form of a bundle is described. The electrode "needle" (bundle) consists of several parallel, insulated wires glued together. When wire of 100μ diameter is used the diameter of a 6-electrode bundle is about 0.4 mm. The most suitable length of the electrode bundle was found to be about 220 mm. The stereotaxic device developed for use with the electrode bundle consists of two parts—a base and a right angle with a tilting frame. A pinion with a holder for the needle guide moves along the arc of the tilting frame. The tilting frame and the pinion can be fixed in any position, independent of each other, which allows the electrode to be inserted in any direction. P.V.E.

N64-33974 Joint Publications Research Service, Washington, D.C.

THE ROLE OF CONDITIONAL SIGNALIZATION IN THE SPATIAL ANALYSIS IN BATS

A. I. Konstantinov 9 Nov. 1964 15 p refs Transl. into ENGLISH from Zh. Vysshei Nervnoi Deyatel'nosti (Moscow), v. 14, no. 4, Jul.–Aug. 1964 p 701–706

(JPRS-27285; TT-64-51541) OTS: $1.00

The mechanism of time relations and analyzers in the formation of spatial orientation in bats is discussed. A conditioned reflex to the feedbox location was established. Through shifting of the feedbox position, a rearrangement of the nervous processes was initiated and was observed by the delaying-time differential. It was concluded that a directed behavior in bats is always a result of elaboration of the reaction of the conditioned-reflex character. G.G.

N64-33975 Joint Publications Research Service, Washington, D.C.

PROBLEMS IN THE MECHANICS OF RADIATION INJURY

A. D. Zurabashvili and B. R. Naneishvili 9 Nov. 1964 9 p Transl. into ENGLISH from the book "Voprosy Patoarkhitektoniki Luchevogo Porazheniya" Tbilisi, Publ. House of Acad. of Sci. GSSR., 1962 p 58–66

(JPRS-27289; TT-64-51545) OTS: $1.00

This is a study of the pathological aspects of nervous tissue injury due to deep X-ray therapy. The brain substance was found to be fairly sensitive to ionizing radiation. The pathological shifts produced in the central nervous system were the results of hemodynamic disturbances, and also the direct effect of penetrating radiation on the cerebrospinal system. The different degrees of injury of the central nervous system sections depended on their functional significance, levels of development, and phylogenetic formation. G.G.

N64-33993 Illinois U., Urbana

TO DETERMINE THE EFFECT OF IRRADIATION UPON THE WHOLESOMENESS OF FOOD Progress Report, Mar.–Sep. 1962

Elwood F. Reber, Om P. Malhotra, and Horace W. Norton [1962] 129 p refs

(Contract DA-49-007-MD-72800)

(PR-14; AD-401022)

A total of 1030 rats of the Sprague–Dawley and Holtzman strains were used to investigate the effects of estrogen, testosterone, vitamin K, methionine, and strain of rat on the incidence of hemorrhagic disease in adult and weanling rats fed irradiated beef (5.58 megarad). Results are reported in terms of each individual effect, and in terms of cross influences and masking among the various factors. D.E.W.

IAA ENTRIES

A64-26089
VISUAL EVOKED POTENTIALS AS A FUNCTION OF FLASH LUMINANCE AND DURATION.
J. D. Wicke, E. Donchin, and D. B. Lindsley (California, University, Dept. of Psychology, Los Angeles, Calif.).
Science, vol. 146, Oct. 2, 1964, p. 83-85. 7 refs.
Contracts No. DA-49-007-MD-722; No. Nonr-233(32).

Report of computer-averaged recordings of visual evoked potentials which utilized visual stimuli of constant duration and varying luminance, as well as flashes whose luminance and duration varied reciprocally. With constant duration, the latency, amplitude, and waveform of the evoked response varied as a function of luminance. The effects of decreasing the luminance on amplitude and waveform of the responses can be balanced by increasing the duration of the flash. This reciprocity between luminance and duration suggests, it is considered, that a relationship exists between apparent brightness and evoked potentials.

A64-26180
HEALTH PROGRAM FOR RADIATION WORKERS.
W. D. Norwood (General Electric Co., Hanford Atomic Products Operation, Occupational Health Operation, Richland, Wash.).
(American Medical Association, Annual Congress on Occupational Health, 24th, Houston, Tex., Sept. 26, 27, 1964.)
Archives of Environmental Health, vol. 9, Oct. 1964, p. 529-535. 25 refs.

Discussion of some modifications to existing industrial health programs, indicated for radiation workers. Technical factors of concern in setting radiation-protection standards for workers are examined. These are: factors causing variation in radiation effects; sources of exposure to radiation; the latent period between time of radiation exposure and onset of symptoms; dose rates; susceptibility to radiation effects (depending on age, sex, and constitutional differences); and effects in relation to doses. The medical supervision of the radiation worker and the establishment of radiation-protection guides are discussed.

A64-26380
MANNED SPACE FLIGHT - SOME SCIENTIFIC RESULTS.
V. V. Parin, Iu. M. Volynkin, and P. V. Vasil'ev (Academy of Sciences, Dept. of Physiology, Moscow, USSR).
COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper. 33 p. 39 refs.

Presentation, discussion, and comparison of physiological data obtained during USSR and USA manned space flights, with special reference to results obtained by the USSR. Detailed results of tests performed on the astronauts during and after flight are presented and evaluated. It was observed that the individuals were able to carry out assigned tasks while under prolonged weightlessness, and little serious discomfort was noted. Certain temporary postflight physiological irregularities were noted which varied between individuals. It is considered that methods of selecting astronauts are in general adequate for the present, and that although many problems will be encountered, manned space-flight programs can be confidently extended. It is also considered that automatic devices are best employed in combination with a human pilot rather than by themselves.

A64-26525
SPACE FLIGHT PROBLEMS - MECHANICAL, MEDICAL, AND MORAL.
Leslie W. Ball and Romney H. Lowry (Federal Aviation Agency, Office of Aviation Medicine, Washington, D. C.).
(American Medical Association, Annual Meeting, 113th, San Francisco, Calif., June 24, 1964.)
American Medical Association, Journal, vol. 189, Sept. 28, 1964, p. 1013-1015.

Discussion, from the medical point of view, of typical space missions, the causes of equipment unreliability, physiological and psychological problems, and the type of research physicians are performing in the aerospace industry, with an outline of the action being taken to assure the level of mental and moral discipline required for space conquest. The Apollo project and the Air Force Manned Orbiting Laboratory are briefly described, with reference to the stresses to which the astronauts will be subjected and to the necessity for absolute reliability throughout a long sequence of complex functions. Causes of equipment unreliability are considered to be poor workmanship, inspection, and design. Comment is made that many defects were found in equipment supplied for Project Mercury. Physiological and psychological effects of weightlessness, severe noise, vibration, and prolonged acceleration are discussed. It is concluded that immediate space conquest is not limited by technical problems but by the inability to ensure that the very large numbers of people directly concerned have sufficient mental and moral discipline to ensure an acceptable degree of reliability.

A64-26635
A REDETERMINATION OF QUIET THRESHOLDS AS A FUNCTION OF STIMULUS DURATION.
T. I. Hempstock, M. E. Bryan, and W. Tempest (Liverpool, University, Chadwick Laboratory, Sub-Dept. of Acoustics, Liverpool, England).
Journal of Sound and Vibration, vol. 1, Oct. 1964, p. 365-380. 28 refs.

Determination of the quiet threshold of audibility for five subjects at frequencies from 125 to 10,000 cps, for tone durations from 1 msec to 5 sec, and for continuous tones. The measurements, conducted in free-field conditions, were preceded by experiments to determine factors affecting accuracy and to establish an optimum procedure. The probable error is not above 1 db over most of the range. The measured curves are well described by the integration theory of threshold for durations below 1 sec and frequencies up to 1000 cps. At 10,000 cps the threshold for continuous tones is about 11.0 db higher than the threshold of a 1-sec tone of the same frequency. V. Z.

A64-26636
THE ACOUSTICAL IMPEDANCE OF HUMAN EARS.
M. E. Delany (National Physical Laboratory, Applied Physics Div., Teddington, Middx., England).
Journal of Sound and Vibration, vol. 1, Oct. 1964, p. 455-467. 18 refs.

Determination of the acoustical impedance of 23 human ears over a frequency range of 20 cps to 8000 cps with leakage effects minimized, by observations through the aperture of four specified earcaps. Median values of the real and imaginary components of impedance and electrical analog networks simulating these impedance characteristics are presented with estimates of intersubject variance. The variation of impedance with force applied to hold the earcap against the ear is also considered. Basic impedance data required for the design of an improved artificial ear are thus made available. V. Z.

A64-26640
COMMAND BY SPEECH IN AEROSPACE AUTOMATION [BEFEHLSSPRACHE IN LUFT- UND RAUMFAHRTAUTOMATIK].
F. Winckel.
Wissenschaftliche Gesellschaft für Luft- und Raumfahrt and Deutsche Gesellschaft für Raketentechnik und Raumfahrtforschung, Jahrestagung, Berlin, West Germany, Sept. 14-18, 1964, Paper. 11 p. 18 refs. In German.

Discussion of automatic control based on the recognition of phonetic patterns by control equipment. The effects of delayed speech feedback are reviewed, and the acoustic properties of speech are described. A formant-coding speech-compression system is examined in which additional linguistic control is achieved by using the statistical dependence of subsequent tones in the sense of a Markov chain. It is shown that the state of the art enables the realization of a command language consisting of about 10 words - the numbers from 0 to 9, for example. V. P.

A64-26707
THE ILLUSION OF MOVEMENT.
Paul A. Kolers.
Scientific American, vol. 211, Oct. 1964, p. 98-106.

Brief discussion of the general subject of illusions and description of some experiments with the illusion of movement that can be created under controlled conditions with a suitably timed flashing of lights. It is concluded that, in addition to several behavioral criteria that distinguish real and apparent movement, the experiments reveal that the "mechanism" for illusory movement has more in common with the "mechanism" controlling the formation of simple visual figures than it has with real movement. It is stated that the experiments also support a hypothesis recently advanced tentatively, namely that perceptions are constructed by means of a number of different operations occurring at different times and places in the nervous system. It is noted that this could be called an "assembly line" model of visual perception. M. M.

A64-26812
EFFECTIVENESS OF PHARMACO-CHEMICAL PROTECTION AGAINST GAMMA AND 660- AND 120-MEV-ENERGY PROTONS [EFFEKTIVNOST' FARMAKO-KHIMICHESKOI ZASHCHITY PRI GAMMA-OBLUCHENII I OBLUCHENII PROTONAMI S ENERGIEI 660 I 120 MEV].
V. S. Shashkov, P. P. Saksonov, V. V. Antipov, V. S. Morozov, G. F. Murin, B. L. Razgovorov, N. N. Suvorov, and V. M. Fedoseev.
Kosmicheskie Issledovaniia, vol. 2, July-Aug. 1964, p. 641-647. 40 refs. In Russian.

Results of biological irradiation tests on mice. Action of gamma rays from Co^{60} and 660- and 120-Mev protons on 1360 mice is investigated. For a gamma-ray dose of 364 rad/min, $DL_{100/30}$ is 720 rad. For irradiation by a 660-Mev-proton pulse beam, $DL_{100/30}$ is ~1178 rad. Intraperitoneal injections of 150 mg/kg cystamine, 150 gr/kg aminoethylisothiouronium, 50 mg/kg serotonin, and 75 mg/kg 5-methoxytryptamine administered 10 to 15 min prior to the irradiation saved the life of 50-80% of the mice. V. Z.

A64-26813
OCCURRENCE OF CROSSING OVER IN MALE DROSOPHILA CAUSED BY VIBRATION, ACCELERATION AND GAMMA-RADIATION [VOZNIKNOVENIE KROSSINGOVERA U SAMTSOV DROZOFILY POD VLIIANIEM VIBRATSII, USKORENIIA I γ-OBLUCHENIIA].
G. P. Parfenov.
Kosmicheskie Issledovaniia, vol. 2, July-Aug. 1964, p. 648-653. 8 refs. In Russian.

Discussion of the influence of 0.4-mm-amplitude vibrations, 5000 rev/min acceleration, and Co^{60} gamma-radiation on the incidence of crossing over in the chromosomes of male Drosophila flies. Maximum incidence of crossing over is observed on the ninth day after gamma irradiation of cultures kept at 25 + 1°C. Vibration for four hours at 70 cps induced crossing over but reduced the effect of a subsequent gamma-irradiation. Testing procedures are described in detail and data obtained are tabulated. V. Z.

A64-26849
SENSORY ALTERNATION AND PERFORMANCE IN A VIGILANCE TASK.
Alin Gruber (Dunlap and Associates, Inc., Stamford, Conn.).
Human Factors, vol. 6, Feb. 1964, p. 3-12. 23 refs.
Research supported by the Dunlap and Associates; Contract No. AF 19(628)-1654.

Report of an experimental investigation to determine possible means of arresting a vigilance decrement. The experimental conditions are: (1) visual detection alone; (2) auditory detection alone; (3) combined (redundant) visual and auditory detection; and (4) alternating, in 30 minute periods, auditory and visual detection. The setting and apparatus are described, and the procedure used is discussed. The results are presented in graphical and tabular form. It is found that: (1) sensory alternation was an effective means of maintaining alertness; (2) redundant, dual-sense monitoring resulted in significantly fewer false responses; (3) there were no differences between the four conditions with respect to median response times; and (4) response times did increase with the length of the watch over the four conditions. T. V. Y.

A64-26850
EFFECTS OF VISUAL DISPLAY MODE ON SIX HOURS OF VISUAL MONITORING.
Carl E. Webber and Jack A. Adams (Illinois, University, Dept. of Psychology, Aviation Psychology Laboratory, Urbana, Ill.).
Human Factors, vol. 6, Feb. 1964, p. 13-20. 15 refs.
Contract No. AF 41(609)-1481.

Report of an investigation. The purpose of the research is mentioned. The method is discussed with respect to the apparatus, experimental conditions, and the subjects. The task had 12 stimulus sources arrayed over 60°, and alphanumeric signals that persisted for 6 sec. Each group of 15 subjects had a different display configuration: normally off, normally on, and normally on with noise. The results are presented in graphical form. It was found that the display mode influenced overall mean performance but not vigilance decrement. The amount of vigilance decrement was small despite the long session, and its magnitude was essentially the same as that of previous studies whose sessions were shorter. T. V. Y.

A64-26851
ON RESPONSE-RESPONSE COMPATIBILITY.
Kenneth Cross, Merrill Noble, and Don Trumbo (Kansas State University, Manhattan, Kan.).
Human Factors, vol. 6, Feb. 1964, p. 31-37. 7 refs.

Report of an investigation. Concepts pertinent to the experiment are discussed. The methods involved are presented. These include: the subjects; the apparatus, which is shown in a schematic diagram; stimuli; selection of stimulus sequences; and experimental design. A two-hand cranking task is used to give four possible combinations of clockwise and counterclockwise movements to make up the four response conditions. It was concluded that: (1) the speed of both total adjustment and initial response was dependent upon the particular stimulus type used, but not dependent upon response conditions; (2) the number of correct initial movements was dependent upon response conditions but not the stimulus types. The latter, however, was a function of response sets rather than compatibility. No evidence of significant interaction was found. T. V. Y.

A64-26852
JOY STICK VS. MULTIPLE LEVERS FOR REMOTE MANIPULATOR CONTROL.
Billy M. Crawford (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Behavioral Sciences Laboratory, Wright-Patterson AFB, Ohio).
Human Factors, vol. 6, Feb. 1964, p. 39-48. 8 refs.

Report of an investigation of a joy stick and a multiple-lever for the same remote manipulator to determine the relative effectiveness of the two control modes. The manipulator consists of three segments and corresponds to the human arm. The controls used are illustrated, and the motions required for the joy-stick mode are given. The placing and turning subtests of the Minnesota rate-of-manipulation test are used. This involves picking up numbered disks and placing them in numbered holes. The results show that elbow and shoulder pivot motions were the principle sources of error with most of the difference between control modes being attributed to the elbow-pivot motion. It is found that the joy-stick mode of control in terms of performance time and rate of learning is clearly favored. Dissatisfaction with control-effector relationships is expressed by subjects who used the joy-stick control. It is concluded that total error scores do not differ significantly for the two control modes, and that, with practice, the effectiveness of the multiple-lever system approaches that of the joy-stick. T. V. Y.

A64-26853
THE EFFECT OF DISPLAY UPDATE RATE ON IMMEDIATE MEMORY.
James M. Sheldon (System Development Corp., Santa Monica, Calif.).
Human Factors, vol. 6, Feb. 1964, p. 57-62. 5 refs.

Report of an investigation. It is desired to know how many system variables can be handled at once and at what rate simultaneous changes in the states of these variables can be displayed without overburdening the memory of the monitor. The following areas are covered: subjects, materials, procedure followed, experimental design, and display materials. The results are presented in tabular form. It was concluded that update rate at the levels tested was found not to have a significant effect on immediate memory. T. V. Y.

A64-26855
EFFECTS OF PRACTICE ON DIAL READING.
John W. Carveth and Jack A. Adams (Illinois, University, Dept. of Psychology, Urbana, Ill.).
Human Factors, vol. 6, Feb. 1964, p. 81-85. 11 refs.

Report of an investigation. It is felt that the inferiority of linear scales when compared with circular scales for reading accuracy and percent correct can be eliminated with practice and exposure time. These are the variables in the experiment. The method employed is presented along with the experimental procedure. The results are presented in graphical form and discussed. No practice effects were found when percent correct and amount of error were analyzed. It is concluded that dial design is a significant variable and that circular dials were found to be superior to vertical dials. At best, practice seems to have a small effect on dial reading.
T. V. Y.

A64-26857
VIGILANCE AS A FUNCTION OF STIMULUS VARIETY AND RESPONSE COMPLEXITY.
Terrence S. Luce (Bellcomm, Inc., Washington, D.C.).
Human Factors, vol. 6, Feb. 1964, p. 101-110. 19 refs.

Report of an investigation. The purpose of the experiment was to determine the effects on vigilance performance of random insertion of artificial signals and complexity of required response. Several measures of task performance are analyzed: average time to detect real signals, intrasubject variability in detection time, percentage of real signals detected, number of errors made under different conditions of response complexity, and occurrence of movement extraneous to task requirements. The methods used are presented. The results are given in graphical and tabular form. These show that the introduction of artificial signals enhanced vigilance performance by reducing the variability in detection response time and by increasing percentage of signals detected. There was no significant decrement in response times over the task session. Introduction of a complex response requirement into the task did not result in improved vigilance performance. T. V. Y.

A64-26917
MAN IN SPACE [L'HOMME DANS L'ESPACE].
R. Angiboust, P. Biget, J. Fabre (Centre d'Enseignement et de Recherches de Médecine Aéronautique, Service de Santé des Armées, Paris, France), R. Grandpierre (Bordeaux, Université, Faculté de Médecine, Bordeaux; Ecole Pratique des Hautes Etudes, Laboratoire de Biologie Aérospatiale, Paris, France), and F. Violette (Nantes, Université, Faculté de Médecine, Nantes; Centre d'Enseignement et de Recherches de Médecine Aéronautique, Ecole Militaire de Médecine Aéronautique, Paris, France).
IN: ASTRONAUTIQUE ET RECHERCHE SPATIALE.
Edited by Henri Moureu and Michel Yves Bernard.
Paris, Dunod, 1964, p. 270-320. 5 refs. In French.

Consideration of biological problems connected with space exploration by manned vehicles. The subjects treated are man's tolerance to speed and accelerations, biological effects of weightlessness and physiological reactions to weightless flights, ionizing radiations, extended stay in a locked cabin, taking of carbon dioxide and water from a space cabin to supply regenerating units, and return to the carbon-dioxide and water-vapor cycle. M. M.

A64-27025
EVALUATION OF THE BIOLOGICAL EFFICIENCY RESERVES OF A PILOT [ZUR BEURTEILUNG DER BIOLOGISCHEN LEISTUNGSRESERVE EINES PILOTEN].
H. Brüner, D. Jovy, K. E. Klein, and S. Ruff (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin; Godesberg, West Germany).
IN: WISSENSCHAFTLICHE GESELLSCHAFT FÜR LUFT- UND RAUMFAHRT E.V. (WGLR), JAHRESTAGUNG IN BRAUNSCHWEIG VOM 9. BIS 12. OKTOBER 1962, JAHRBUCH.
Edited by Hermann Blenk.
Braunschweig, Friedrich Vieweg und Sohn, 1963, p. 576-580; Discussion, p. 580, 581. 10 refs. In German.

Discussion of a hypoxia resistance test developed at the Institute of Aviation Medicine of the DVL. Described is psychomotive and low-pressure equipment to assess the condition of a pilot, revealing changes in stress resistance and improvements or decline in physical efficiency. The method is particularly suitable for selection and routine inspection of flying personnel. V. P.

A64-27026
BIODYNAMIC PROBLEMS OF AERONAUTICS AND ASTRONAUTICS [BIODYNAMISCHE PROBLEME DER LUFT- UND RAUMFAHRT].
Rolf Coermann (Max-Planck-Institut für Arbeitsphysiologie, Dortmund, West Germany; USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
IN: WISSENSCHAFTLICHE GESELLSCHAFT FÜR LUFT- UND RAUMFAHRT E.V. (WGLR), JAHRESTAGUNG IN BRAUNSCHWEIG VOM 9. BIS 12. OKTOBER 1962, JAHRBUCH.
Edited by Hermann Blenk.
Braunschweig, Friedrich Vieweg und Sohn, 1963, p. 581-591; Discussion, p. 591, 592. 14 refs. In German.

Discussion of the dynamic factors of the human body and the space environment that affect pilot efficiency. The significance of the dynamic characteristics of the skin and muscular system for the protection of hearing is examined, as is the effect of mechanical vibrations of various frequencies upon human efficiency. Mechanical impedance curves for the entire human body are presented, and the variability of these curves is illustrated as a function of body position restraining-system effects. The relation between the dynamic behavior of the human body and the resistance to vibration is explained. The theoretical aspects of the effect of shocks upon a human body are outlined, and the limits of human endurance are noted. Some results obtained with animals and anthropometric dummies are presented. V. P.

A64-27027
PHYSIOLOGICAL HEAT PROBLEMS OF SPACEFLIGHT [PHYSIOLOGISCHE HITZEPROBLEME DER RAUMFAHRT].
H.-M. Wegmann, H. Brüner, D. Jovy, and K. E. Klein (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Godesberg, West Germany).
IN: WISSENSCHAFTLICHE GESELLSCHAFT FÜR LUFT- UND RAUMFAHRT E.V. (WGLR), JAHRESTAGUNG IN BRAUNSCHWEIG VOM 9. BIS 12. OKTOBER 1962, JAHRBUCH.
Edited by Hermann Blenk.
Braunschweig, Friedrich Vieweg und Sohn, 1963, p. 592-595. 15 refs. In German.

Discussion of the heat load an astronaut can be expected to endure. The limitations of heat shields and protective devices are noted, and the effects of a high-temperature environment upon human efficiency are examined, with particular reference to aptitude tests. The application of a physiological criterion, based on pulse beat and internal body temperature, to space training programs and cabin design is discussed. V. P.

A64-27028
POSSIBILITIES AND PROBLEMS OF OPERATING QUASI-STORAGE AND SUPPLY FREE BIOLOGICAL LIFE-SUPPORT SYSTEMS FOR ASTRONAUTS [MÖGLICHKEITEN UND PROBLEME DES BETRIEBES VON QUASI VORRATS- UND NACHSCHUBFREIEN BIOLOGISCHEN VERSORGUNGSSYSTEMEN FÜR RAUMFAHRER].
Wolfgang Briegleb (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Godesberg, West Germany).
IN: WISSENSCHAFTLICHE GESELLSCHAFT FÜR LUFT- UND RAUMFAHRT E.V. (WGLR), JAHRESTAGUNG IN BRAUNSCHWEIG VOM 9. BIS 12. OKTOBER 1962, JAHRBUCH.
Edited by Hermann Blenk.
Braunschweig, Friedrich Vieweg und Sohn, 1963, p. 596-600. 27 refs. In German.

Discussion of the development of a self-sustained life-support system, on the basis of symbioses that exist in nature between animals and plants and between autotropic and heterotropic plants. A variety of such symbioses is noted and discussed. It is seen that the recovery of secreted water, the gas exchange, and food recycling, of which the life-support system is composed, can be accomplished stepwise using a number of special organisms.
V. P.

A64-27129
RADIATION DOSES IN INTERPLANETARY FLIGHT.
T. Foelsche (NASA, Langley Research Center, Hampton, Va.).
IN: AMERICAN ASTRONAUTICAL SOCIETY, ANNUAL MEETING, 9TH, LOS ANGELES, CALIF., JANUARY 15-17, 1963, PROCEEDINGS (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 13).
Edited by Eric Burgess.
North Hollywood, Western Periodicals Co., 1963, p. 90-103. 17 refs.

Study of the effects of Van Allen belt radiations, galactic cosmic rays, and solar cosmic rays. On the basis of data on these radiations, upper and lower limits of rad doses which would have been encountered in interplanetary flight during the past solar cycle under practical amounts of mass shielding are estimated. From the order of magnitude of the physical doses, it is tentatively concluded that: the overall ionization dosage produced by the low-level galactic cosmic radiation should not have serious or discernible aftereffects after expeditions of one to two years; staying within the inner Van Allen belt for 10 min or the outer belt for 2 hr (transition times typical for Pioneers 3 and 4), an expedition would not be exposed to a radiation hazard; extreme and therefore hazardous solar cosmic-ray events occurred with a frequency of one to four per year and would have exposed an inadequately protected man to a surface dose of 1000 rad or more. Quantities of shielding necessary to give varying degrees of protection are determined. D. H.

A64-27135

EVOKED RESPONSES FROM THE AUDITORY CORTEX.

Donald C. Teas and Nelson Y-s. Kiang (Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communications Sciences, Cambridge; Massachusetts Eye and Ear Infirmary, Eaton-Peabody Laboratory of Auditory Physiology, Boston, Mass.).

Experimental Neurology, vol. 10, Aug. 1964, p. 91-119. 34 refs. Army-USAF-Navy-supported research; NSF Grant No. G-16526; National Institute of Health Grants No. MH 04737-03; No. B 1344; Grant No. NsG-496.

Report of a study of evoked responses recorded from the auditory cortex of unanesthetized cats. With clicks of moderate intensity, the waveforms of the responses were highly repeatable among awake cats. Introduction of certain variables such as localized injury to cortex, anesthesia, or sleep resulted in more-or-less characteristic changes in the waveform of the evoked responses. In particular, the later components of the responses seemed to be more sensitive to changes in the state of the animal, while the early components seemed to be abolished by local injury to the cortex. The evoked responses and particularly the later components did not always behave in a reliably repeatable fashion as click intensity or click rate was changed. When broadband background noise was introduced, the click-evoked responses always showed a characteristic decrease in the earliest component. The later components were not substantially affected until the noise was raised to an intensity that was sufficient to mask the click for a listener. These results are interpreted in terms of multiple projection pathways to the cortex. D. H.

A64-27144

RADIATION GENETICS OF THE RHESUS MONKEY, MACACA MULATA. II - THE EFFECTS OF X-IRRADIATION ON THE SPERMATOGENESIS OF THE MONKEY, MACACA MULATTA.

C. C. Tan, S. Y. Chao, C. S. Chang, and T. T. Liu (Futan University, Institute of Genetics, Shanghai, Communist China).

(Universitas Fudanensis, Acta Scientiarum Naturalium, vol. 7, no. 1, 1962, p. 99-112.)
Scientia Sinica, vol. 13, Aug. 1964, p. 1253-1264. Abridged. 15 refs. Translation.

Experimental investigation of the quantitative and morphological changes in the different cell types of the testes of macaca mulatta caused by X-irradiation. The radiosensitivity of the cells at different stages of spermatogenesis was found to be in close agreement with the similar experimental data previously obtained in rodents. The degree of radiosensitivity appears to be in inverse relationship with the progress of maturation, namely, it is highest in the spermatogonial stage and becomes gradually lower in the order of primary spermatocytes, secondary spermatocytes, and spermatids, down to spermatozoa, which prove to be least sensitive. However, the counts of spermatids and spermatozoa also showed some signs of decrease in number as compared with the controls, indicating that they are likewise sensitive to some extent. The seminiferous tubules underwent obvious shrinkage, resulting in a corresponding increase of Sertoli cells, although the latter rarely multiplied. M. M.

A64-27272

PROBLEMS OF ENGINEERING PSYCHOLOGY IN ASTRONAUTICS AND SOME RESULTS OF INVESTIGATIONS [ZADACHI INZHENERNOI PSIKHOLOGII V KOSMONAVTIKE I NEKOTORYE REZUL'TATY ISSLEDOVANII].

V. G. Denisov, E. S. Zav'ialov, A. P. Kuz'minov, M. M. Sil'vestrov, and V. I. Iazdovskii.

Kosmicheskie Issledovaniia, vol. 2, Sept.-Oct. 1964, p. 783-796. 9 refs. In Russian.

Definition of the subject of engineering psychology as a science approaching man and machine as an integral cybernetic system. A composite method is proposed for evaluating the closed operator-ship system which uses both cybernetic information on the ship equipment and physiological recording of the functioning of the human organism. Typical man-operated spaceship control systems are diagrammed. Activity of the astronaut in a Vostok-type spaceship in terms of effort and time is discussed in detail. Versatile ground training is emphasized. V. Z.

A64-27273

REACTIVITY STATE OF THE ANIMAL ORGANISM IN THE WAKE OF THE ACTION OF SOME FACTORS OF A SPACEFLIGHT [SOSTOIANIE REAKTIVNOSTI ORGANIZMA ZHIVOTNYKH POSLE VOZDEISTVIIA NEKOTORYKH FAKTOROV KOSMICHESKOGO POLETA].

V. V. Antipov, B. I. Davydov, E. F. Panchenkova, P. P. Saksonov, and G. A. Chernov.

Kosmicheskie Issledovaniia, vol. 2, Sept.-Oct. 1964, p. 797-804. 17 refs. In Russian.

Experimental results for the change in physical stress reactivity in animals after overstress, combined action of X-rays and acceleration, and 120-Mev proton irradiation. The observations indicate a prolonged decline of physical stress endurance in mice subjected to acceleration and ionizing radiation. The change in endurance of centrifuged mice has correlation with variations in ceruloplasmin in blood plasma. V. Z.

A64-27274

EXPERIMENTAL INVESTIGATIONS OF THE EFFECTS OF LANDING IMPACT OVERLOADS ON ANIMAL ORGANISMS [EKSPERIMENTAL'NYE ISSLEDOVANIIA VLIIANIIA UDARNYKH PEREGRUZOK PRIZEMLENIIA NA ORGANIZM ZHIVOTNYKH].

S. A. Gozulov, G. P. Miroliubov, N. N. Popov, and N. I. Frolov.

Kosmicheskie Issledovaniia, vol. 2, Sept.-Oct. 1964, p. 805-811. 11 refs. In Russian.

Study of the effects on mice and dogs of impact loads generated at landing speeds of 4 to 13.6 m/sec. The relationship between the morphological changes in internal organs, functional disorders of the cardiovascular system, and the impact magnitude is determined. The complex nature of the physiological effect of landing impact is emphasized, and further studies are suggested. V. Z.

A64-27497

NOTE ON BINAURAL MASKING-LEVEL DIFFERENCES AS A FUNCTION OF THE INTERAURAL CORRELATION OF THE MASKING NOISE.

N. I. Durlach (Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communications Sciences, Cambridge, Mass.).

Acoustical Society of America, Journal, vol. 36, Sept. 1964, p. 1613-1617. 10 refs.
Contract No. DA 36-039-AMC-03200(E); NSF Grant No. GP-2495; National Institutes of Health Grant No. MH 04737-04; Grant No. NsG-496.

Discussion of a model of binaural masking-level differences in which it is assumed that the interaural relations of the two masking signals are statistical. The data considered are those of Robinson and Jeffress, describing the variation in the binaural masked threshold as a function of the cross-correlation coefficient of the masking components. The Robinson-Jeffress experiment is described in some detail, and it is concluded that the new model and the old model are both special cases of a more general model, the details of which have not yet been worked out. D. H.

A64-27581
INTERACTION OF BIOGEN AMINES IN THE MECHANISM OF IONIZING-RADIATION PROTECTION BY HISTAMINE [VZAIMODEISTVIE BIOGENNYKH AMINOV V MEKHANIZME ZASHCHITY GISTAMINOM OT DEISTVIIA IONIZIRUIUSHCHEI RADIATSII].
S. Ia. Rapoport, E. I. Krichevskaia, and S. R. Zubkova (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 155, Apr. 11, 1964, p. 1198-1200. 8 refs. In Russian.

Investigation of the protective effect of histamine: (1) with the sympathetic nerve system made functionally inactive by ergotamine; (2) with the catecholamine and serotonin, stored in the organism, being depleted by repeatedly pre-administered reserpin; and (3) by administering of a serotonin antagonist. The procedure of tests, in which white rats are used, is described in detail. The protective effect of histamine and its effects on the adrenalin and noradrenalin content in the adrenal glands and on the serotonin content in the tissue of the brain and small intestines are tabulated. V. Z.

A64-27587
STABILITY OF FUNCTIONALLY HETEROGENEOUS FRACTIONS OF DEOXYRIBONUCLEIC ACID WITH RESPECT TO IONIZING RADIATION [OB USTOICHIVOSTI FUNKTSIONAL'NO NEODNORODNYKH UCHASTKOV DNK PO OTNOSHENIIU K IONIZIRUIUSHCHEI RADIATSII].
G. E. Fradkin (Institut Biofiziki, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 155, Mar. 11, 1964, p. 457-460. 10 refs. In Russian.

Discussion of the factors determining stability of the mechanism of storing genetic information and the mechanism of controlling the transmission of genetic information, in terms of cybernetics. Experiments are conducted in which disorder in the function of the cystron-operator, characterized by the generation of virulent mutants of the moderate ν-phage, is used as the indicator of the radio-sensibility of the controlling mechanism. The procedure of the experiments is described in detail. V. Z.

A64-27592
THE MECHANISM OF DNA-LEVEL REDUCTION IN TISSUES AFTER EXPOSURE OF AN ORGANISM TO IONIZING RADIATION [O MEKHANIZME SNIZHENIIA UROVNIA DNK V TKANIAKH POSLE DEISTVIIA NA ORGANIZM IONIZIRUIUSHCHEI RADIATSII].
I. I. Ivanov, O. N. Borovikova, V. G. Vladimirov, V. B. Dolgo-Saburov, and V. I. Sharobaiko (Voenno-Meditsinskaia Akademiia, Leningrad, USSR).
Akademiia Nauk SSSR, Doklady, vol. 155, Mar. 21, 1964, p. 683, 684. 9 refs. In Russian.

Cytospectrophotometric investigation of the effect of ionizing radiation upon the organism of mammals, resulting in a disruption of the reproduction rate of desoxyribonucleic acid (DNA) and a decrease in DNA content in the radiosensitive tissues. The DNA content in the radiosensitive cells of rats is established, taking into account the various functional states of the cells. A comparison of the DNA content prior to and after irradiation is given in a table. V. P.

A64-27596
MAN'S SHORT-TIME TOLERANCE TO SINUSOIDAL VIBRATION.
William E. Temple, Neville P. Clarke, James W. Brinkley, and Morris J. Mandel (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
(Aerospace Medical Association, Annual Scientific Meeting, 35th, Miami Beach, Fla., May 11-14, 1964.)
Aerospace Medicine, vol. 35, Oct. 1964, p. 923-930. 9 refs.
NASA-supported research.

Determination of man's voluntary, subjective, short-time tolerance limits to sinusoidal vibrations at frequencies between 3 and 20 cps in the three orthogonal axes. The general shape of a series of curves depicting tolerable levels of vibration acceleration as a function of frequency has been defined. Two different support and restraint systems have been employed, and the influence of the system used on the tolerance limits reached is discussed. The reasons for the observed differences are analyzed. It has been found that the magnitude of acceleration tolerated at each frequency and, to some extent, the type of symptom, are influenced by both the experimental design and the support and restraint system used. The type of symptom occurring appears to be somewhat dependent upon the acceleration level reached. Emphasis is given to the fact that, for manned space vehicles, high amplitudes of vibration in the 1- to 20-cps frequency range are to be avoided, if possible. (Author) M. M.

A64-27597
MODIFICATION OF THE EFFECTS OF TWO WEEKS OF BED REST UPON CIRCULATORY FUNCTIONS IN MAN.
Perry B. Miller, Bryce O. Hartman, Robert L. Johnson, and Lawrence E. Lamb (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
Aerospace Medicine, vol. 35, Oct. 1964, p. 931-939. 13 refs.

Experimental investigation of the effects of 2 weeks of bed rest on circulatory functions in 72 healthy subjects, using two different intervals of 2 weeks' bed rest. The value of various procedures in maintaining normal cardiovascular reflex regulatory mechanisms during bed rest was evaluated. It is stated that a 15-fold increase in syncopal reactions and a significant increase in orthostatic heart rate occurred after 2 weeks of bed rest. Physical activity and tilt-table training for 4 weeks between the two bed-rest periods resulted in a decrease of the resting heart rate and an improvement in orthostatic tolerance. An improvement in orthostatic tolerance after bed rest was noted with the various prophylactic procedures utilized. A program consisting of exercise and tilt-table training before bed rest, and intermittent venous occlusion in the extremities during bed rest in a 10-degree head-up bed resulted in almost complete preservation of normal orthostatic tolerance. Various in-bed procedures tended to prevent hematological changes previously noted with simple bed rest. An antigravity suit proved very effective in preventing postural syncope after bed rest. (Author) M. M.

A64-27598
INFLUENCE OF STRONG MAGNETIC FIELDS ON THE ELECTROCARDIOGRAM OF SQUIRREL MONKEYS (SAIMIRI SCIUREUS).
Dietrich E. Beischer and James C. Knepton, Jr. (U.S. Naval School of Aviation Medicine, Pensacola, Fla.).
(Aerospace Medical Association, Annual Scientific Meeting, 35th, Miami Beach, Fla., May 11-14, 1964.)
Aerospace Medicine, vol. 35, Oct. 1964, p. 939-944. 5 refs.
NASA-sponsored research.

Experimental investigation of the effects of strong magnetic fields on the electrocardiograms of squirrel monkeys. Electrocardiograms of four monkeys were recorded during exposure of the animals to magnetic fields of 20,000 to 70,000 gauss. It is stated that neither breathing rate nor R-wave amplitude of the ECG was affected. A decrease in the heart rate, an increase in the degree of sinus arrhythmia, and a considerable augmentation of the amplitude of the T wave are said to be newly observed biomagnetic effects. It is noted that the results of the investigation indicate a pronounced influence of strong magnetic fields on electrical processes in living matter and that a cautious approach to systematic human exposure to magnetic fields may be warranted. (Author) M. M.

A64-27599
MECHANICAL IMPEDANCE AS A TOOL IN RESEARCH ON HUMAN RESPONSE TO ACCELERATION.
Edmund B. Weis, Jr., Neville P. Clarke, James W. Brinkley, and Paul J. Martin (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
(Aerospace Medical Association, Annual Scientific Meeting, 35th, Miami Beach, Fla., May 11-14, 1964.)
Aerospace Medicine, vol. 35, Oct. 1964, p. 945-950. 12 refs.

Discussion of the problem of developing quantitative standards and design limits for human exposures to dynamic acceleration. The concept of the development of a mechanical impedance model of the human, to quantitate energy transfer from the environment to the human, is reviewed. The methods of measurement and calculation of impedance, as well as some current results, are discussed. The utilization of the impedance results in the process of protection-system development is presented as a criterion for performance. The meaning of the impedance results and their correlation with tolerance experimentation are discussed. (Author) M. M.

A64-27602
CORRELATION OF PARACHUTE LANDING INJURIES AND SURFACE WIND VELOCITY.
Richard M. Chubb, Emmert C. Lentz, and Robert H. Shannon (USAF, Directorate of Aerospace Safety, Life Sciences Group, Norton AFB, Calif.).
Aerospace Medicine, vol. 35, Oct. 1964, p. 962-965.

Investigation of the outcome of 931 parachute landings, following emergency ejections from aircraft, to correlate surface wind velocity with injuries sustained during landings. Tables show the correlation of injuries, terrain, and surface wind velocity, as well as surface wind velocities for landing injuries only. It is stated that the only noticeable effect of surface wind velocity on the outcome of the 137 parachute landings in water was that 37 landings were made in winds of 5 knots or less without any fatalities, while 6 people drowned as a result of dragging in winds of more than 5 knots. It is noted that landing injuries and fatalities could be reduced in this group of personnel. The greatest reduction of fatalities could be achieved by utilization of devices activated by salt water to release the parachute risers and inflate flotation gear after entry into the sea. It is stated that a device is presently being distributed that will make the release of the risers easier for a person who is conscious, and this should eliminate a number of serious dragging injuries. M. M.

A64-27603
PREDOMINANCE OF ANTI-COMPENSATORY OCULOMOTOR RESPONSE DURING RAPID HEAD ROTATION.
G. Melvill Jones (McGill University, Dept. of Physiology, Aviation Medical Research Unit, Montreal, Canada).
Aerospace Medicine, vol. 35, Oct. 1964, p. 965-968.
Defense Research Board of Canada Grant No. 9310-92.

Description of experiments with human subjects which show that, when the head is jerked with high angular velocity, say to the right, large anticompensatory flicks drive the eyes well over in the leading direction, in this case to the right, where they remain until the head slows down. Then the expected compensatory response to the left begins to appear. It is stated that, if the high head angular velocity is artificially maintained, as on a turntable, the expected compensatory response may be virtually eliminated for several seconds, presumably owing to prolonged action of a strongly maintained anticompensatory response. This phenomenon can occur in the rolling plane and has been demonstrated during flight in the initial stages of a rapid rolling maneuver. It is noted that consequent failure of retinal-image stabilization could presumably cause serious impairment of visual acuity at this critical moment. The fact that exclusion of vision and neck proprioception do not prevent predominance of the anticompensatory response, points to a vestibular cause. This in turn suggests that vestibular signals can exercise a substantial measure of control over the quick, anti-compensatory, phase of nystagmus. (Author) M. M.

A64-27604
VISUAL FIELD CHANGES DURING POSITIVE ACCELERATION.
E. A. Jaeger, R. J. Severs, S. D. Weeks, and T. D. Duane (Jefferson Medical College, Dept. of Ophthalmology, Philadelphia; U.S. Naval Air Development Center, Johnsville, Pa.).
Aerospace Medicine, vol. 35, Oct. 1964, p. 969-972. 17 refs.
Grant No. NB 04233-02.

Investigation of the pattern of visual-field loss by means of a special plethysmographic goggle-type ophthalmodynamometer. It is stated that the molecular pattern of visual field closure is the same whether due to ophthalmodynamometry, positive acceleration, or a combination of both. It consists of an initial selective nasal field defect which approaches a hemianopic character before marked temporal field loss begins. The last remaining visual field is not at fixation but is confined to an island located temporarily between fixation and the blind spot. The belief is expressed that this pattern is best explained by the anatomic arrangement of the retinal arteriolar system. (Author) M. M.

A64-27605
HEMODYNAMIC VARIATIONS IN THE ANESTHETIZED DOG DURING SIMULATED WEIGHTLESSNESS.
W. F. Geber (South Dakota, University, School of Medicine, Dept. of Physiology and Pharmacology, Vermillion, S. Dak.).
Aerospace Medicine, vol. 35, Oct. 1964, p. 972-978. 16 refs.
Contract No. AF 41(609)-1589.

Determination of the influence of the hypodynamic state on the hemodynamics of the anesthetized dog during weightlessness. Anesthetized dogs were exposed to the hypodynamic state by flotation in a constant-temperature saturated saline bath for periods ranging from 60-350 min. Continuous recording of heart rate, carotid and femoral blood pressure and blood flow, femoral vein pressure, and right ventricular pressure was carried out. It is stated that, during the hypodynamic state, femoral and carotid artery blood flow increased, femoral and carotid blood pressure decreased, femoral vein and right ventricular pressures decreased, with little or no significant change in cardiac rate. Return to normal gravity produced decrease in femoral and carotid artery blood flows to levels below control values, femoral and carotid artery pressure increases to levels below control values, femoral vein and right ventricular pressures increase above control values, and again insignificant cardiac rate changes. It is noted that there was some tendency to cardiac irregularities either on entering or leaving the hypodynamic state. (Author) M. M.

A64-27606
NEW TECHNIQUES IN PRESSURE SUIT COOLING.
Edward C. Wortz, David K. Edwards, III, and Thomas J. Harrington (Garrett Corp., Los Angeles, Calif.).
Aerospace Medicine, vol. 35, Oct. 1964, p. 978-984.

Investigation of methods of reducing the latent heat load of personnel wearing environmental suits. Suit-cooling methods are described which use liquid heat transport loops, with heat exchangers inside the environmental suit, and which appear to offer considerable promise for overcoming most of the disadvantages of ventilation cooling at high metabolic rates. It is stated that the principal advantages of the methods described are reducing the ventilation flow and minimizing sweat rate, while achieving complete removal of the metabolic heat. Because of the physiological stress problems known to exist with ventilation-cooling methods at high metabolic rates, the belief is expressed that future life-support systems and space suits will utilize liquid cooling methods. (Author) M. M.

A64-27607
DYNAMICS OF THE SEMICIRCULAR CANALS COMPARED IN YAW, PITCH AND ROLL.
G. Melvill Jones, W. Barry, and N. Kowalsky (McGill University, Dept. of Physiology, Aviation Medical Research Unit, Montreal, Canada).
Aerospace Medicine, vol. 35, Oct. 1964, p. 984-989. 21 refs.
Research Board of Canada Grant No. 9910-37.

Experimental comparison of response patterns to rotational stimuli in the jaw ("horizontal"), pitch (sagittal) and roll (coronal) planes of the head, treating the semicircular canal system as a 3-D sensing device. The method of postrotational stimulation on an electronically controlled turntable was used, both subjective cupulometry (S) and objective measurement of slow-phase eye angular velocity (O) being employed to measure the time course (time constant) of decay in response. The mean time constants obtained from (S) in yaw, pitch, and roll were 10.2 (± 1.8), 5.3 (± 0.7), and 6.1 (± 1.2) respectively, the corresponding values from (O) being 15.6 (± 1.2), 6.6 (± 0.7), and 4.0 (± 0.4). All values are in seconds. Brackets contain 2 x S.E. The yaw-pitch and yaw-roll differences were highly significant ($P < 0.001$). It is concluded that the effective time constants of postrotational decay in the planes of pitch and roll are considerably shorter than in yaw. It is stated that, in the context of aviation, this implies a considerably greater rate of development of error in response to rotational stimuli in pitch and roll than in yaw. Numerical examples are given of the penalty to be expected. (Author) M. M.

A64-27622
THRESHOLDS OF THE CALORIC NYSTAGMUS DURING ROTATION AT A CONSTANT VELOCITY [POROGI KALORICHESKOGO NISTAGMA VO VREMIA VRASHCHENIIA S POSTOIANNOI SKOROST'IU].
I. V. Orlov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR).
Akademiia Nauk SSSR, Doklady, vol. 156, June 1, 1964, p. 972-975. 18 refs. In Russian.

Experimental investigation of the quantitative characteristics of excitability of man's vestibular system under conditions of a prolonged stay in a slowly and uniformly rotating chamber. For this purpose, a method is developed for determining the thresholds

of excitability of semicircular canals using caloric (temperature) tests. The cervical caloric nystagmus is used as an index. J. R.

A64-27739

CHANGE IN THE PROPERTIES OF BRAIN PROTEINS IN THE CASE OF HYPEROXIA [IZMENENIE SVOISTV BELKOV MOZGA PRI GIPEROKSII].

A. I. Lukash and Z. S. Gershenovich (Rostovskii-na-Donu Gosudarstvennyi Universitet, Rostov, USSR).

Akademiia Nauk SSSR, Doklady, vol. 157, July 21, 1964, p. 714, 715. 6 refs. In Russian.

Investigation of the proteolysis of the brain of white rats following exposure to oxygen pressures of 6 and 3.5 atmospheres for periods of 20 to 30 and 90 minutes, respectively. The results, presented in the form of tables, indicate that hyperoxia tends to decrease the number of water-soluble brain proteins, while the rate of proteolysis changes in dependence on the preceding functional state. V. P.

A64-27752

REACTION TIME AND THE RETINAL AREA - STIMULUS INTENSITY RELATIONSHIP.

Lyle E. Hufford (North American Aviation, Inc., Space and Information Systems Div., Downey, Calif.).

Optical Society of America, Journal, vol. 54, Nov. 1964, p. 1368-1373. 23 refs.

NSF-supported research.

Description of experiments in which reaction time was measured from the onset of a signal flash to the manual release of a microswitch. Two well-trained subjects responded under varying conditions of stimulus area and luminance. Two types of stimulus pattern were used: (1) five equal circles, each subtending very nearly 9', centered on the corners and centers of squares whose diagonals subtended seven angles in geometric progression from 44' 28", $1^{o}8'$, $1^{o}32'$, $1^{o}57'$, $2^{o}22'$, $2^{o}46'$, and $3^{o}10'$; and (2) single circles subtending eight angles in geometrical progression from 20', 44' 28", $1^{o}8'$, $1^{o}32'$, $1^{o}57'$, $2^{o}22'$, $2^{o}46'$, and $3^{o}10'$ - the first of which has the same area as the total area of the five circles in each pattern of the first type. Several different luminances were used with each pattern of each type. A physiological summation theory with non-independence of retinal receptor elements is reportedly suggested by the results of both experiments. (Author) D. H.

A64-27753

DIFFERENTIAL COLOR SENSITIVITY IN THE PURPLE REGION.

Mary M. Connors and Michael H. Siegel (U.S. Naval Medical Research Laboratory, Groton, Conn.).

Optical Society of America, Journal, vol. 54, Nov. 1964, p. 1374-1377 16 refs.

Presentation of an analysis of measurements of color discrimination by the method of constant stimuli at eight points along a blue-to-red continuum. The standard deviations of judgments of color difference were used as the measure of discrimination. In terms of ratios of luminances of the components, the sensitivity throughout most of the purple region is relatively constant. There is some decrease in sensitivity at the blue extreme and a larger decrease at the red end. The results are plotted on a CIE x, y chromaticity diagram and compared with similar data of other authors. (Author) D. H.

A64-27808

VISUAL DISPLAY SIMULATION OF LUNAR LANDING UNDER REMOTE CONTROL BY A HUMAN OPERATOR.

H. F. Meissinger and F. J. Belsky (Space Technology Laboratories, Inc., Inertial Guidance and Control Laboratory, Redondo Beach, Calif.).

IN: SPACE RENDEZVOUS, RESCUE, AND RECOVERY; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM, AIR FORCE FLIGHT TEST CENTER, EDWARDS AFB, CALIF., SEPT. 10-12, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 16, PART 2).

Edited by Norman V. Petersen.

North Hollywood, Western Periodicals Co., 1963, p. 54-76. 5 refs.

Discussion of TV command guidance techniques applicable to the lunar landing problem and presentation of results obtained by manned simulation. The Space Technology Laboratories, Inc. manned spacecraft control simulator used in the study is described in detail. This simulator provides a visual presentation by means of a closed-circuit television system which moves in six degrees of freedom relative to a lunar-terrain model. The simulator can also be applied to manned orbital rendezvous and docking studies by substituting a scale model of the target spacecraft in place of the lunar-terrain model. Results of the study indicate man's ability to steer the lunar vehicle to the desired landing site and achieve terminal accuracies of 20 to 40 ft without the benefit of an on-board landing-point prediction computer. The operator is capable of compensating to some degree for systematic errors in the guidance sensors on board the vehicle. The presence of the lunar transmission time delay does not affect the terminal accuracy significantly. F. R. L.

A64-27814

ROLE OF THE PILOT DURING RENDEZVOUS.

Robert L. Stapleford (Systems Technology Corp., Inglewood, Calif.).

IN: SPACE RENDEZVOUS, RESCUE, AND RECOVERY; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM, AIR FORCE FLIGHT TEST CENTER, EDWARDS AFB, CALIF., SEPT. 10-12, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 16, PART 2).

Edited by Norman V. Petersen.

North Hollywood, Western Periodicals Co., 1963, p. 153-155.

Discussion of the problems of obtaining the best utilization of man during orbital rendezvous. A wide spectrum of possibilities is considered, ranging from the simple case of a man looking out of a window and having some means of attitude and translational control, through methods of improving the pilot's capabilities by addition of simple aids, such as a magnifying periscope or optical range finder, up to complex systems where it is necessary to consider their failure operation, and whether or not to supply a reduced-performance backup mode or go to redundancy. Comment is made that presently proposed systems do not utilize human capability to any large extent. It is believed that more emphasis should be devoted to finding simple aids to improve capability and overcome limitations. F. R. L.

A64-27823

MEDICAL ASPECTS OF THE RESCUE ENVIRONMENT.

Paul A. Campbell.

IN: SPACE RENDEZVOUS, RESCUE, AND RECOVERY; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM, AIR FORCE FLIGHT TEST CENTER, EDWARDS AFB, CALIF., SEPT. 10-12, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 16, PART 2).

Edited by Norman V. Petersen.

North Hollywood, Western Periodicals Co., 1963, p. 227-229.

Consideration of some critical elements of life-support management within the spacecraft itself during an emergency which might require rescue. Such management can be broken into environmental management and human-energy management. Factors involved are pressurization integrity and availability of oxygen, which must be assured almost immediately. Time then becomes a little less critical to evaluate effectiveness of CO_2 removal, air or gas circulation, and temperature-humidity control. If communication with the Earth is possible, monitors can advise on problems of energy and water management. Then a survey and assessment of total oxygen, water, and food supply would be made, the first two items being critical. Balancing of all factors is complex, requiring extensive knowledge of physiology, and is cited in support of the case for a physician as a crew member. It is emphasized that time is of the essence. F. R. L.

A64-28087

ENVIRONMENTAL CONTROL.

B. H. Rowlett and R. H. Lee (Garrett Corp., AiResearch Manufacturing Co., Los Angeles, Calif.).

Space/Aeronautics, vol. 42, Sept. 1964, p. 106-109. 12 refs.

Discussion of problems of environmental control. Thermal control of electronic equipment, which depends largely on the choice of heat sink and thermal transport method, is said to be possibly the most difficult aspect of environment control. For gas storage, supercritical cryogenic storage vessels have been developed that reduce the weight penalty to about 20% of the high pressure storage. At zero g, however, subcritical storage poses the problem of how to ensure phase separation, which is necessary if vapor is to be

delivered to pressure regulators and similar pneumatic components. The removal of body heat is being studied. Physiological considerations must be taken into account when selecting the composition and total pressure of a mixed-gas atmosphere: prevention of hypoxia, oxygen toxicity, atelectasis, and aeroembolism. Researchers generally favor an atmospheric composition of 50% oxygen and 50% nitrogen held at about 7 psia. For extended missions, a regenerable or continually operating CO_2 removal system must be used. Intensive current work is aimed at the development of a reliable low-pressure process for the recovery of oxygen from metabolic wastes, particularly CO_2. Water management problems are considered.
T. V. Y.

A64-28168

TEACHING MACHINES, AND THEIR POSSIBLE APPLICATIONS IN THE FIELD OF AVIATION [LEHRMASCHINEN UND IHRE EINSATZMÖGLICHKEITEN IM BEREICH DER LUFTFAHRT].
G. Emde (Bölkow-Entwicklungen KG, Munich, West Germany).
Wissenschaftliche Gesellschaft für Luft- und Raumfahrt and Deutsche Gesellschaft für Raketentechnik und Raumfahrtforschung, Jahrestagung, Berlin, West Germany, Sept. 14-18, 1964, Paper. 14 p. In German.

Discussion of the various aspects of the problem of substituting teaching machines for human teachers. The principles of training and instruction by means of teaching machines are reviewed, and some principal types of teaching machines are examined. It is seen that a thorough study of the possibilities which arise from automatic teaching is indicated, and that it may lead to means and ways of using it to good advantage. This is seen to apply particularly to the application of instruction machines to maintenance and repair problems of transport aircraft.
V. P.

A64-28338

BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17).
Edited by William C. Kaufman (USAF, Office of Aerospace Research, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
North Hollywood, Western Periodicals Co., 1964. 119 p. $9.75.

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A64-28339

THE NECESSITY FOR BIOLOGICAL EXPERIMENTATION IN SPACE.
Loren D. Carlson (Kentucky, University, Medical Center, Dept. of Physiology and Biophysics, Lexington, Ky.).
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17).
Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 1-20. 14 refs.
Contract No. AF 33(657)-9331.

Discussion and assessment of data from spaceflights, and extrapolation of data from simulation experiments, which are considered to justify the conclusion that man can survive in near-Earth orbit for four days. However, there is suggestive evidence that physiological changes occur during spaceflight which may impair performance in re-entry and in re-establishment of Earth (1g) existence. It is likely that this adverse effect will be increased by increased time in space, unless properly counteracted. Analysis of the dynamics of systems involved, such as the cardiovascular system, and mechanisms of control of bone and muscle mass emphasize the need for data on the time constants of these systems and the minimal cycling or stress application necessary to maintain the response characteristics and system integrity to allow re-establishment of Earth habitation. Specific experimental design for ground-based experiments is required to provide the basic tests and test procedures to make biological experimentation in space significant. A step-analysis method of experiment directed at critical systems in animals and in man should be developed in ground-based laboratories and extended to animal experiments in space and significant measurements on humans.
F. R. L.

A64-28340

THE PATHOPHYSIOLOGY OF DISUSE AND SOME PROBLEMS OF PROLONGED WEIGHTLESSNESS.
Michael McCally (Yale University, School of Medicine, New Haven, Conn.).
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17).
Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 21-28. 9 refs.

Discussion of what is known of the physiologic effects of prolonged human exposure to weightlessness. Bed rest, immobilization, and water immersion of human subjects are being reinvestigated as it is felt that these conditions may bear some physiologic analogy to the weightless state. Shifts in body-fluid distribution, diuresis, and loss of normal orthostatic tolerance are among the known consequences of exposure to such deconditioning environments and have been predicted as likely consequences of exposure to weightlessness. Available physiologic data from manned spaceflight suggest that hemoconcentration, diuresis, and orthostatic hypotension may result from relatively brief exposure to weightlessness. The mechanisms that may be responsible for the observed changes are discussed. A program is urgently needed to integrate the laboratory and clinical study of deconditioning environment with the in-spaceflight study of the effects of prolonged weightlessness. Only by extending his knowledge of the basic physiologic mechanisms involved in antigravity compensation will man be able to define these effects and to devise appropriate protective devices or techniques necessary to each new space operation. Spaceflight is considered to offer the first opportunity to explore the gravity dependence of biologic functions, to which man has previously been adapted.
F. R. L.

A64-28341

THE BIOLOGICAL RHYTHM PROBLEM AND ITS BEARING ON SPACE BIOLOGY.
Frank A. Brown, Jr. (Northwestern University, Dept. of Biological Sciences, Evanston, Ill.).

IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17). Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 29-39. 13 refs.
Contract No. Nonr 1228-03; NSF Grant No. G-15008; National Institutes of Health Grant No. RG-7405.

Discussion of the possible persistence of solar-day, lunar-day, monthly, and annual rhythms of animal and plant rhythmic systems under unvarying conditions of all ordinarily controlled environmental factors. Under such controlled conditions a duplex rhythmic state exists: (1) adaptive, adjustable rhythmic patterns modifiable by such factors as light, temperature, and feeding schedule; and (2) geophysically dependent rhythmic variations resulting from continuous organismic response to normally uncontrolled residual physical rhythms. The significance of the rhythmic phenomena for space biology hinges importantly upon still unresolved problems. The question is asked whether the biological rhythms are the indispensable integrating clocks for life that they appear to be, and if so, whether the timing system of the rhythms depends upon response to weak geophysical rhythms. The demonstrated existence of the geophysically dependent rhythmic component, together with the recently proven, extraordinary sensitivities of living creatures to the Earth's very weak magnetic, electric, and radiation fields raises the question of how far, and for how long, weak fields such as these can deviate in strength from their natural values without deleterious effects. F. R. L.

A64-28342

THE SEARCH FOR EXTRATERRESTRIAL LIFE.
Allan H. Brown (Pennsylvania, University, Div. of Biology, Philadelphia, Pa.).
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17). Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 41-60.

Discussion of methods of identifying any life which may exist beyond the limits of the terrestrial biosphere, especially with reference to Mars, and of the subsequent investigation of its chemical, physical, metabolic, and other properties. In general, life is assumed to consist of discrete organisms, to be essentially aqueous, to have a carbon-based chemistry, to exhibit a kind of genetic control of reproduction, to possess enzyme-like catalysts, and to exhibit both heterotrophy and autotrophy. Detection of Martian life can be achieved with unmanned probes which can acquire evidence of various kinds. Evidence of life collected by experiments landed on the Martian surface may be morphological, chemical, physical, or physiological. The Martian biota is expected to include microorganisms and may consist of them exclusively. It is essential that all space probes sent to Mars be certified as sterile. International cooperation in exobiology is said to offer major scientific advantages and should be more easily achieved than in any other area of space research or exploration in which both US and USSR programs are involved. It is considered that there is urgency in being prepared to launch a space probe to Mars at the most propitious opportunity, which will come in 1969. That would make possible Martian surface sampling during the spring and summer when the best chance of detecting the proliferation of plant-like organisms would be expected. F. R. L.

A64-28343

MAN IN SPACE.
Harold C. Urey (California, University, La Jolla, Calif.).
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17). Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 61-64.

Discussion of the role of man in lunar and planetary exploration. Comment is made that manned flight in the immediate neighborhood of the Earth above the atmosphere has so far produced little or no information of scientific value. In the case of lunar exploration, much more interesting scientific information can be looked for by competent scientifically trained men. Because of doubt as to the mode by which the Moon was formed, with consequent doubt as to its structure, it is considered that only men with detailed knowledge in regard to meteorites and rocks can be expected to unravel the details and come to reliable conclusions from their observations. Although manned instrument probes can acquire a great amount of useful data at relatively low cost, yet there is still a place for direct observation, especially in the fields of geology and biology. Physical, psychological, and educational requirements for astronauts are discussed. F. R. L.

A64-28344

SELECTING THE MAN FOR SPACE EXPLORATION.
Don Flickinger.
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17). Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 65-78.
12 refs.

Consideration of how to select the optimal man for the task. Key points explored are: the job requirements for man to fulfill in space exploration, the criteria to be used as a basis for selection, the methods and procedures used for the selection process, the analysis and evaluation of results and experiences to date, and a consideration of future trends and possibilities. Job requirements can be listed as the ability to: (1) contribute to the design and development of the vehicle, (2) establish in-flight operational procedures, (3) assist in the development of in-flight test and observational equipment, (4) operate and maintain the spacecraft during the actual mission, (5) perform scheduled tests and observations in flight, (6) exercise judgment and decision-making under emergency conditions, and (7) return the spacecraft and himself safely to Earth. Upon completion of described medical and psychological testing and evaluation procedures, the entire selection team reviews data and impressions and classifies candidates as qualified (outstanding), qualified, qualified (with minor reservations), and disqualified. Comment is made that, in the absence of positive information, only negative selection techniques can be applied, inasmuch as candidates are excluded who show organic or functional deviations or defects which it is believed would threaten their survival and/or performance in space exploration. F. R. L.

A64-28345

ACCELERATION, VIBRATION AND IMPACT.
Neville P. Clarke (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
IN: BIOASTRONAUTICS - FUNDAMENTAL AND PRACTICAL PROBLEMS; PROCEEDINGS OF THE AMERICAN ASTRONAUTICAL SOCIETY SYMPOSIUM HELD AS PART OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, ANNUAL MEETING, 130TH, CLEVELAND, OHIO, DECEMBER 30, 1963 (ADVANCES IN THE ASTRONAUTICAL SCIENCES. VOLUME 17). Edited by William C. Kaufman.
North Hollywood, Western Periodicals Co., 1964, p. 79-88.

Discussion of the severity of effect of mechanical force environment on aerospace crewmen in relation to the vehicle characteristics, to the protection system utilized, and to the presence of other environmental stimuli. Acceleration, vibration, and impact research in bioastronautics strives to develop quantitative expressions of the body's response to mechanical forces and to derive objective design criteria for systems to protect man against these forces. F. R. L.

A64-28379
SPACEFLIGHT AND CYBERNETICS [RAUMFAHRT UND KYBER NETIK].
K. Steinbuch.
Wissenschaftliche Gesellschaft für Luft - und Raumfahrt and Deutsche Gesellschaft für Raketentechnik und Raumfahrtforschung, Jahrestagung, Berlin, West Germany, Sept. 14-18, 1964, Paper.
33 p. 81 refs. In German.

General discussion of the relationship between spaceflight and cybernetics, covering such areas as: control circuits for guidance, stimulation of electronic development through spaceflight, automata and man in outer space, and spaceflight and cybernetics as cultural factors. First, cybernetics as a science is defined, and then several examples of the use of Shannon's formulas for determining the capacity of a channel are treated, together with the problems of information storage capacities, miniaturization of components, redundant circuits, perception of signals by man and automata, and types of wireless information transmission.
J. R.

A64-28414
THE PROTECTIVE ACTION OF STREPTOMYCIN ON RADIATION-AFFECTED CHROMOSOMES OF SEXUAL CELLS OF MAMMALS [ZASHCHITNOE DEISTVIE STREPTOMITSINA NA RADIATSIONNOE POVREZHDENIE KHROMOSOMY POLOVYKH KLETOK MLEKOPITAIUSHCHIKH].
Vei Shao, Du-Gun Van, and Khan Chzhan (Gilinskii Pedagogicheskii Universitet, Biologicheskii Fakul'tet, Communist China).
(Kexue Tongbao, no. 2, 1964.)
Scientia Sinica, vol. 13, Sept. 1964, p. 1523-1526. 9 refs. In Russian.

Experimental investigation of the protective action of low-concentration streptomycin on chromosomes in sexual cells of white mice subjected to radiation. Results showing the effect of various concentrations of streptomycin on the frequency of chromosome aberrations after irradiation are given in tabular form. It is shown that 16 hr after irradiation the percentage of cells with chromosome aberrations constituted 10.4%, and after 38 hr 9.18%. J. R.

A64-28416
BIOLOGICAL RHYTHMS - A NEW TYPE IN STRAINS OF A MUTANT OF NEUROSPORA CRASSA.
Peter W. Neurath and Martha D. Berliner (Avco Corp., Wilmington, Mass.).
Science, vol. 146, Oct. 30, 1964, p. 646, 647. 6 refs.
Contract No. NAS 2-1536.

Report of the formation of growth bands in Neurospora. It was found that the formation, with periods ranging from 15 to 90 hours, depends strongly on temperature and on composition of the growth medium, but not upon cycles of light and dark. The rhythm is endogenous but not "circadian." F. R. L.

A64-28417
HUE-WAVELENGTH RELATION MEASURED BY COLOR-NAMING METHOD FOR THREE RETINAL LOCATIONS.
Robert M. Boynton, William Schafer, and Mary Ellen Neun (Rochester, University, Rochester, N.Y.).
Science, vol. 146, Oct. 30, 1964, p. 666-668. 6 refs.
Grant No. NB-00624.

Report of application of a method of hue measurement, in which an absolute color-naming procedure is utilized, to spectral stimuli delivered as flashes at 0°, 20°, and 40° eccentricity in an otherwise dark field. The method yields very reliable measures, especially at 0°. Color-naming at 0° differs little from that at 20°, but a marked deterioration of performance occurs between 20° and 40°. This is reflected by a reduction in red and especially green responses, and a lower reliability of the measurements. Additional estimates were also obtained which showed a decrease in measured saturation but increasing reliability of the saturation measurements with increasing eccentricity. F. R. L.

A64-28455
THE PROBLEM OF IONIZING RADIATIONS IN SPACE FLIGHT.
Antonio Pasinetti and Laura E. Pasinetti (Milano, Università, Istituto di Farmacologia, Sezione di Bioastronautica; Consiglio Nazionale delle Ricerche, Centro di Astrofisica, Osservatorio Astronomico di Milano-Merate, Milan, Italy).
IN: INTERNATIONAL ASTRONAUTICAL CONGRESS, 13TH, VARNA, BULGARIA, SEPTEMBER 1962, PROCEEDINGS. VOLUME I.
Edited by Nicolas Boneff and Irwin Hersey.
Vienna, Springer-Verlag, 1964, p. 271-291. 40 refs.

Discussion of the individual effects of primary cosmic rays, solar radiation, and the radiation from the Van Allen belts upon the organism of an astronaut. The origin and nature of these types of radiation are examined, as are the biological doses produced by the fluxes of these radiations. The biological protection of astronauts and the character of radiobiological injuries caused by protons and X-photons penetrating into the spacecraft are discussed. The relations between radiation inside and outside the vehicle, and dose rates of the different types of radiation are outlined, and methods for reducing the doses of radiation absorbed by the astronauts and for preventing possible radiation injuries are proposed.
V. P.

A64-28456
STERILIZATION OF LUNAR AND PLANETARY SPACE VEHICLES - A REVIEW.
Carl-Johan Clemedson (Göteborg, University, Dept. of Hygiene, Göteborg, Sweden).
IN: INTERNATIONAL ASTRONAUTICAL CONGRESS, 13TH, VARNA, BULGARIA, SEPTEMBER 1962, PROCEEDINGS. VOLUME I.
Edited by Nicolas Boneff and Irwin Hersey.
Vienna, Springer-Verlag, 1964, p. 292-313. 87 refs.

Study emphasizing the necessity of sterilizing all objects to be landed on the Moon and the near planets, to avoid contamination of these celestial bodies by terrestrial microorganisms and organic matter. It is shown that such a contamination might seriously impair the study of the chemical composition of primeval and prebiotic matter and the presence of extraterrestrial life. The present status of the contamination problem is examined on the basis of recent astronomical and biological research. V. P.

A64-28457
STUDIES CONCERNING ADAPTATION OF THE CARDIOVASCULAR SYSTEM OF PILOTS, AT VARIOUS GROUND AND LOW-PRESSURE CONDITIONS, WITH AND WITHOUT PRESSURE SUIT [ETUDE CONCERNANT L'ADAPTATION DE L'APPAREIL CARDIOVASCULAIRE CHEZ LES AVIATEURS EN DIFFERENTES CONDITIONS DE SOL ET D'HYPOBARISME, AVEC ET SANS COSTUME DE COMPENSATION].
G. Arsenescu, S. Schiau, and A. Ionascu (Académie de la République Populaire Roumaine, Institut de Physiologie Normale et Pathologique, Bucharest, Rumania).
IN: INTERNATIONAL ASTRONAUTICAL CONGRESS, 13TH, VARNA, BULGARIA, SEPTEMBER 1962, PROCEEDINGS. VOLUME I.
Edited by Nicolas Boneff and Irwin Hersey.
Vienna, Springer-Verlag, 1964, p. 314-342. 23 refs. In French.

Discussion of observations on the arterial pressure, the EEG, hemodynamic factors, the pneumogram, roentgenkymogram, thoracic diagraphy, and phonocardiogram, performed on groups of pilots. The tests were made: (1) at ground conditions with oxygen breathing over a pressure range from 15 to 75 mm Hg; (2) under hypobaric conditions at 5000 m without oxygen breathing, and at 12,000 m with oxygen breathing, at normal pressure with and without a pressure suit; and (3) at 14,000, 16,000, and 18,000 m, with pressure suit and oxygen breathing, at pressures of 200, 450, and 900 to 1000 mm H_2O. The extensive results obtained are examined and evaluated. V. P.

A64-28458
SOME PROBLEMS OF EXPERIMENTAL SPACE PHYSIOLOGY - ON THE PROBLEM OF TRANSVERSE ACCELERATIONS.
P. V. Vasil'ev, A. D. Voskresenskii, and O. G. Gazenko (Academy of Sciences, Moscow, USSR).
IN: INTERNATIONAL ASTRONAUTICAL CONGRESS, 13TH, VARNA, BULGARIA, SEPTEMBER 1962, PROCEEDINGS. VOLUME I.
Edited by Nicolas Boneff and Irwin Hersey.
Vienna, Springer-Verlag, 1964, p. 343-352. 14 refs.

Survey of techniques used to obtain physiological information on the effects of spaceflight on the human organism. Existing techniques are discussed in terms of two approaches to experimental space physiology: (1) exploration of a relatively small number of standard physiological indices in the simulation of the effects of some factors of actual spaceflight, and (2) investigation of the physiological mechanisms of the effects of these factors upon the organism. The importance of the experimental study of the

physiological mechanisms is demonstrated by examples of the effect of forward and transverse accelerations in aviation medicine. It is shown that, using (1) the results of investigations of the hemodynamics of pulmonary circulation, (2) the consumption of oxygen by the miocardium, (3) O_2 tension in the brain tissues and in the functions of the central nervous system, and (4) theoretical data, it is possible to construct a scheme of the main physiological effects of forward acceleration. It appears feasible to give a quantitative description of the physiological changes, and to construct a model that would reflect the principal changes experienced by an organism during the various phases of a spaceflight. Such a model would provide an improved basis for estimates and predictions of the physical condition of an astronaut, and would enable the development of effective means of increasing human tolerance to severe flight conditions. V. P.

A64-28459

SOME MEDICAL AND BIOLOGICAL PROBLEMS OF MANNED SPACE FLIGHT.

V. I. Iazdovskii and S. A. Gozulov (Academy of Medical Sciences, Moscow, USSR).

IN: INTERNATIONAL ASTRONAUTICAL CONGRESS, 13TH, VARNA, BULGARIA, SEPTEMBER 1962, PROCEEDINGS. VOLUME I.
Edited by Nicolas Boneff and Irwin Hersey.
Vienna, Springer-Verlag, 1964, p. 353-361. 17 refs.

Discussion of some biological and medical problems of manned spaceflight. A review of the complex nature of space biology and space medicine is followed by a discussion of the basic spaceflight factors and the approaches used to their investigation. Some results obtained on board the spaceships Vostok 1 (1961 M 1), Vostok 2 (1961 T 1), Vostok 3 (1962 AM 1), and Vostok 4 (1962 AN 1) are presented, which demonstrate that a spaceflight lasting four days does not impair the working ability or the basic physiological functions of the crew. The general safety problems of a spaceflight are discussed, and means of providing an adequate environment for astronauts are examined. V. P

A64-28578

THE WORK OF THE AERONAUTICAL PHYSICIAN IN BASIC TRAINING SCHOOLS FOR PILOTS AS A PSYCHOLOGICAL CONTRIBUTION IN THE FIELD OF PREVENTIVE MEDICINE [L'OPERA DEL MEDICO D'AERONAUTICA PRESSO LE SCUOLE DI FORMAZIONE BASICA DEL PILOTA QUALE CONTRIBUTO PSICOLOGICO NEL QUADRO DELLA MEDICINA PREVENTIVA].

Mario Strollo.

Rivista Aeronautica, vol. 40, Oct. 1964, p. 1559-1575. In Italian.

Discussion of the general aspects of the psychological contribution of aeronautical doctors to the safeguard of pilots' health, from the standpoint of preventive medicine. The subjects considered are: (1) the machine as a pathogenetic agent, (2) the aeronautical doctor and his duties in connection with the pilot's work, (3) brief historical review of the scientific organization of work, (4) approach to pilots' individual attitudes on the job, (5) the role of the aeronautical physician as the pilot's helper, and (6) individual motivational analysis. M. M.

A64-28588

HEAD-UP OVER THE HILLS - FLYING THE HUNTER MK 12 WITH HEAD-UP DISPLAY.

Mark Lambert.

Flight International, vol. 86, Oct. 22, 1964, p. 709-713.

Report of a 90-min terrain following flight in a special Hunter Mk 12 aircraft fitted with a dual Specto Avionics head-up display, which allows the pilot simultaneously to follow a flight director and to observe the external scene. The basic tracking pattern, projected on the windscreen by a cathode-ray tube, consists of a "winged" ring representing the aircraft bore sight, which remains fixed in the center of the display. Moving relative to it is a broken horizon line giving conventional attitude indication in pitch and roll. To this may be added further horizon lines representing given angles of climb and dive, as well as zenith and nadir crosses representing vertical upward and downward attitudes. The director element is a tapered pattern of three lines and a dot. The tracking task is simply to fly the fixed ring onto the dot. The aircraft had a display for each pilot and a control panel through which director inputs and various speeds, height, and heading data and values could be inserted. It is considered that the head-up display very effectively combines synthetic and natural information for low flying. It keeps the pilot simultaneously in touch with his task and his external surroundings with his eyes constantly at infinite focus. The system can also be extended for use for poor-weather approaches. F. R. L.

LC ENTRIES

A64-81085
EXCRETION OF 5-HYDROXYINDOLE ACETIC ACID IN EXPERIMENTAL TETRAETHYL LEAD POISONING [ESCREZIONE DI ACIDO 5-IDROSSINDOLACETICO NELL'INTOSSICAZIONE SPERIMENTALE DA PIOMBO TETRAETILE].
L. Galzigna, F. Brugnone, and G. C. Corsi (Padua U., Ist. di Med. del Lavoro, Italy).
Medicina del Lavoro, vol. 55, Feb. 1964, p 102–106. 13 refs. In Italian.

Tetraethyl lead poisoning in rabbits caused a statistically significant decrease in the urinary excretion of 5-hydroxyindole acetic acid and a slight increase in the excretion of coproporphyrins and lead. A definite increase was found in the urinary excretion of kynurenic and xanthurenic acids following poisoning. It is concluded that a block exists in the catabolic pathway of hydroxyindoles, and an increase in the elimination of tryptophan via another pathway. This block is probably related to the inhibition by tetraethyl lead of monoamine oxidase, which catabolizes serotonin in the brain.

A64-81086
AEROSPACE MEDICINE COURSE IN THE USA [FLYVEMEDICINSK KURSUS I USA].
E. Arnfred.
Militaerlaegen, vol. 70 Apr. 1964, p. 14–19. In Danish.

A report is presented on a four-week English course for foreigners given at the Maxwell Air Force Base, Montgomery, Alabama, and the Primary Course in Aerospace Medicine at Brooks Air Force Base, San Antonio, Texas. Both courses were attended by the author in 1963. In his evaluation the language course was not essential for a Danish officer. The difference between the Primary Course in Aerospace Medicine and the Danish equivalent is too small to justify the expense incurred in attending it.

A64-81087
PERIPHERAL VASOCONSTRICTION INDUCED BY EMOTIONAL STRESS IN RATS.
George F. Solomom, Rudolf H. Moos (Stanford U., School of Med., Palo Alto, Calif.), George C. Stone, and W. Jeffrey Fessel (Langley Porter Neuropsychiat. Inst., San Francisco, Calif.)
Angiology, vol. 15, Aug. 1964, p. 362–365. 10 refs.

Exaggerated and prolonged peripheral vasoconstriction was produced in response to cold during an experimental attempt to induce arthritis by frustration of activity in rats conditioned to be hyperactive. When kept relatively immoble, the conditioned rats developed lower paw temperatures and showed less adaptation when exposed to cold than did control animals. The results may have a bearing on Raynaud's phenomenon, which is often associated with emotional stress and connective tissue disease.

A64-81088
STUDIES ON THE GENESIS OF STRESS EXPERIENCE [UNTERSUCHUNGEN ZUR GENESE DES ANSTRENGUNGSERLEBNISSES].
Heinz Schmidtke and Hugo Schmale (Max-Planck-Inst. für. Arbeitsphysiol., Psychol. Abt., Dortmund, Germany).
Psychologische Beiträge, vol. 7, Oct. 1963, p. 370–386. 14 refs. In German.

Two hypotheses were explored concerning the relation between quantified physical work and the corresponding subjective experience of stress. The first hypothesis held that subjective stress is primarily a function of energy metabolism in muscle cells. The second conceived of subjective stress as a function of cardiovascular changes during physical work. Experiments with human subjects performing ergometric exercise showed a linear increase in the curve of oxygen consumption while at the same time the subjective stress curve rose exponentially. Experiments on reactive hyperemia of calf muscles during work on the bicycle ergometer provided additional data disproving the first hypothesis. The second hypothesis was supported by the exponential increase of pulse rate during work and summated recovery pulse. The relation between subjective stress and work pulse rate was linear while that with summated recovery pulse progressed nearly exponentially. Of the cardiovascular indices used, work pulse rate showed the closest relation to subjective stress.

A64-81089
A PHENOMENOLOGICAL SCALE FOR THE KINESTHETIC ESTIMATION OF WIDTH: ON THE HOMOGENEITY OF THE REACTION MODE OF A POPULATION. CROSS-SECTION INSTEAD OF LONGITUDINAL SECTION STUDIES? [EINE PHANOMENSKALA FUR KINASTHETISCHE BREITENSCHATZUNGEN:UBER DIE HOMOGENITAT DER REAKTIONSWEISE EINES KOLLEKTIVS. QUERSCHNITT-ANSTELLE VON LANGSSCHNITTUNTERSUCHUNGEN?]
Franz Thurner, (Innsbruck U., Psychol. Inst., Austria).
Psychologische Beiträge, vol. 7, Oct. 1963, p. 408–427. 11 refs. In German.

A description is given of two psychophysical ratio scales employing two different methods (halving, doubling) for successive width estimates by means of thumb and index finger. Twenty-five subjects participated in this study. In addition to scaling techniques the experimental data are used to discuss problems of a theoretical, statistical, and methodological nature.

A64-81090
THE EFFECT OF ILLUMINATION OF THE VEGETATIVE FUNCTIONS OF MAN [DIE WIRKUNG DER BELEUCHTUNG AUF DIE VEGETATIVEN FUNKTIONEN DES MENSCHEN].
Magda Radnot (Budapest U.-Augenklin., Hungary).
Rehabilitation, vol. 17, Apr. 1964, p. 1–5. In German.

The action of visible light on the human organism is not only psychological but also physiological. More precisely, light exerts a stimulating effect on the neuroendocrine system via the visual system. In addition, light also plays an important role as a timer in the diurnal rhythms of physiological functions, e.g., eosinophils, body temperature, water balance, etc. The blind individual does not exhibit the normal diurnal curve of eosinophilic leukocytes. The fall in eosimophils does not take place if a normal subject is kept in continuous darkness. Within this context light may be considered as a phasic regulator of neuroendocrine function.

A64-81091
COMPARATIVE BALLISTOCARDIOGRAPHIC INVESTIGATIONS REGARDING THE PROBLEM OF OBJECTIVE REGISTRATION OF COLORED LIGHT STIMULI [VERGLEICHENDE BALLISTOKARDIOGRAPHISCHE UNTERSUCHUNGEN ZUR FRAGE DER OBJEKTIVEN ERFASSUNG VON FARBLICHTREIZEN].
F. Schennetten.
Rehabilitation, vol. 17, Apr. 1964, p. 28–29. In German.

Fourteen normal subjects were exposed to different color stimuli, three minutes for each stimulus, in a series of white, red, blue, yellow, and green from a 25 W colored bulb. The same series was repeated on another day with a 60 W bulb. The following indices were registered during the experiment: ballistocardiogram, electrocardiogram, and blood pressure. The clearest changes were seen in the ballistocardiogram, particularly with respect to differences between the effects of 25 W and 60 W intensities. Also there were distinctions among red, blue, yellow, and to a lesser extent white, on the I and J peaks. Subjective unpleasant sensations were reported toward the yellow. There was less electrocardiographic response to colored lights. Heart rate and blood pressure varied only slightly. Attention is directed to a special after-wave group designated as O complex, which seems to be sensitive to intensities and colors of light.

A64-81092
ON THE RADIATION PROTECTIVE EFFECT OF PYRIDOXAL-5-PHOSPHATE. [ZUR STRAHLENSCHUTZWIRKUNG DES PYRIDOXAL-5-PHOSPHATS].
H. A. Ladner and R. von Düsterlho (Freiburg U., Klin. Strahleninst. Germany).
Naturwissenschaften, vol. 51, Sep. 1964, p. 407–408. 5 refs. In German.

A total of 230 inbred male Wistar rats were given intraperitoneal or intravenous injections of pyridoxal-5-phosphate in different dose levels. Whole body irradiation (LD 96) was applied varying the interval between injection and irradiation. The survival rate 30 days after irradiation shows that intraperitoneal injections of pyridoxal-5-phosphate five minutes before sublethal irradiation have a protective effect equivalent to that established previously with mice. Lengthening of the interval to 30 minutes apparently decreases this protection. Intravenous injections raised the survival rate from 4% to 70%. Experiments conducted with dogs showed a similar increase of protection against sublethal or lethal whole body irradiation.

A64-81093
THE RELATION OF WORK PERFORMANCE TO HEART RATE IN AGED MAN.
P. Aghemo, F. Mangili (Milan U., Lab. di Fisiol., Italy), and Daniela Gsell, (Inst. of Exptl. Gerontol., Basel, Switzerland).
Gerontologia, vol. 9, 1964, p. 91–97. 6 refs.

Heart rate as related to the oxygen uptake during physical work was studied in 5 young (20 to 30 years old) and 5 old (55 to 80 years old) healthy men. The subjects walked on a gradient of 11.5%. Heart rates were recorded by means of a telecardiograph (Telco) transmitted to the laboratory. In both groups the heart rate was linearly correlated to the intensity of the exercise expressed as net oxygen consumption. The slope of the line is the same for all subjects of the same group, but in the aged group the values are lower. This is explained by an increase of the arteriovenous oxygen difference in the aged in consequence of a slower blood circulation.

A64-81094
SELECTIVE EXTINCTION OF THE ORIENTING REFLEX TO COMPLEX ACOUSTIC AND MULTIMODAL STIMULI [IZBIRATEL'NOE UGASHENIE ORIENTIROVOCHNOGO REFLEKSA NA SLOZHNYE ZVUKOVYE I MUL'TIMODAL'NYE RAZDRAZHITELI].
D. Bouden, E. N. Sokolov and M. M. Karimova (Lomonosov U., Moscow, USSR; and Stanford U., Calif.)
Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 14, Jul.–Aug. 1964, p. 608–617. 18 refs. In Russian.

The orientation reflex was studied in dogs with partially excised auditory areas of the cortex. Electrodes were implanted into the remaining tissue of the auditory area, into the motor area, the thalmus, and the reticular formation of the midbrain. Discrimination of various simultaneous stimuli was appraised by orientation response. The results show that the normal system of nervous stimulus involves the integration of all stimuli directed to one or several centers. Partial removal of the auditory cortex area does not interfere with this mechanism. However, it disturbs discrimination of acoustic stimuli, which differ in sequence and complexity. The conclusion may be drawn that the central part of the auditory area controls differentiation of the acoustic impulses, and the efferent summation of the orientation does not depend upon the passage of impulses through the cortical area, but rather on the radiation of stimuli across the nonspecific areas of reticular formation.

A64-81095
DIURNAL VARIATION IN PLASMA VOLUME IN NORMAL AND HYPERTENSIVE SUBJECTS.
W. I. Cranston (Oxford. U., Dept. of the Regius Professor of Med., (Gt. Brit.)
American Heart Journal, vol. 68, Sep. 1964, p. 427–428.

Plasma volume was measured at 9 to 9:30 A.M. and at 4 to 4:30 P.M. in 10 normal subjects, 9 untreated patients with severe hypertension, 10 hypertensive patients treated with guanethidine alone, 9 patients treated with guanethidine in combination with a benzothiadiazine, and 7 hypertensive patients treated with other drugs. In the normal subjects the plasma volume was slightly greater in the afternoon than in the morning. In the four groups of hypertensive patients the plasma volume in the afternoon was considerably greater than that in the morning. The untreated hypertensive patients showed no significant change in blood pressure between morning and afternoon readings, whereas all but one of the patients receiving guanethidine had a lower blood pressure in the morning than in the afternoon. It appears likely that morning hypotension in patients receiving guanethidine is, at least in part, a consequence of changing plasma volume. The diurnal plasma volume pattern was unaffected by diuretics given at any time of the day and appears to be related to hypertension rather than to the drugs used to treat it. A diurnal variation in hemoglobin concentration was observed which correlated significantly with the observed changes in blood volume, although the change in hemoglobin concentration was less than could be predicted on the basis of dilution of a fixed quantity of circulating hemoglobin.

A64-81096
EFFECT OF REPEATED INHALATION OF VAPORS OF INDUSTRIAL SOLVENTS ON ANIMAL BEHAVIOR. I. EVALUATION OF NINE SOLVENT VAPORS ON POLE-CLIMB PERFORMANCE IN RATS.
M. E. Goldberg, H. E. Johnson, U. C. Pozzani, and H. F. Smyth, Jr.
American Industrial Hygiene Journal, vol. 25, Jul.-Aug. 1964, p. 369–375. 11 refs.
Grant No. NIH-G-OH-16.

Vapors of nine industrial solvents were inhaled by rats selected by successful training performance, and effects on a conditioned avoidance-escape procedure were assessed. Repeated daily inhalation of several of the vapors produced a specific inhibition of the avoidance component of behavior in concentrations which produce no sign of motor imbalance. These vapors were the dimethyl ether of ethylene glycol, trichloroethylene, carbon disulfide, dioxane, and acetone. Several of these evoked behavioral effects at concentrations which did not alter growth rate. Two solvents studied (perchlorethylene and the monomethyl ether of propylene glycol) produced inhibition of the avoidance response only with concentrations which caused frank depressions and ataxia and were attributed to altered motor activity. The monobutyl and monoethyl ethers of ethylene glycol did not affect the behavioral system at any time during the study.

A64-81097
BIOASTRONAUTICS.
Bernard M. Wagner (N. Y. Med. Coll., Dept. of Pathol., New York).
Archives of Pathology, vol. 78, Oct. 1964, p. 454–457. 5 refs.

A brief review of manned space operation from the standpoint of a pathologist is presented. Both United States and Russian spaceflights are discussed as related to effects of acceleration, radiation, and weightlessness. Histochemical and cytological investigations are described. Bioastronautics in the United States offers a new dimension for the pathologist to explore the relationship of structure and function. A pathologist as a member of the space crew is not unreasonable. The next decade will present imaginative and creative challenges to medical scientists to define the survival of man in space and space-induced pathology.

A64-81098
VESTIBULAR MECHANISM, MOTION SICKNESS, AND DRUG THERAPY.
Wallace Rubin (Tulane U. Med. School, Dept. of Otolaryngol., New Orleans, La.)
Archives of Otolaryngology, vol. 80, Oct. 1964, p. 431–439. 17 refs.

Objective recording of nystagmus in both dogs and humans under varying conditions of normalcy and deficiency or disease helped to delineate the various levels of vestibular control. Further clarification of the vestibular pathway was accomplished by combining objective nystagmographic recordings with the use of drugs which are shown to accumulate and which probably have their site of action at various levels of the vestibular pathway. Thiethylperazine accumulated predominantly in the vestibular- and fastigial-nuclei areas and the cortex of the cerebellum. Therefore thiethylperazine should be therapeutically effective in any condition where the symptoms of vertigo originate from stimulation of labyrinthine end organ or vestibular nerve, and where the pathway through the cerebellum is intact. On the other hand, any condition resulting in vertigo the pathologic origin of which lies in the vestibular pathway central to the vestibular nuclei would not be controlled with this drug despite the status of the cerebellum and its vestibular connections.

A64-81099
SOME UNDECIDED QUESTIONS IN THE VIBRATION THEORY [O NEKOTORYKH NERESHENNYKH VOPROSAKH V UCHENII O VIBRATSII].
E. Ts. Andreeva-Galanina (Sanit.-Hyg. Med. Inst. Leningrad, USSR).
Gigiena Truda i Professional'nye Zabolevaniia, vol. 8, Aug. 1964, p 3–7. In Russian.

More extensive control of mechanical vibration of handtools employed in industry and agriculture is needed. Concomitant factors, such as noise, ultrasound, and mechanical effects, should be considered. The effects of vibration on various brain areas are different from the effects of noise. Vibrations of various character and frequency affect an organism in different ways. It is suggested that closer studies of the pathological effects of extended action of sound should be carried out, as well as investigations of the mechanical impact of machinery on the skeletal structure, on various tissues of the organism, and on the nervous system. These studies should antecede the production of mechanical tools employed by workers.

A64-81100
TOXIC EFFECT OF ISOPROPYL-BENZENE HYDROPEROXIDE WHEN APPLIED TO THE SKIN OF EXPERIMENTAL ANIMALS [TOKSICHESKOE DEISTVIE GIDROPEREKISI IZOPROPILBENZOLA PRI NANESENII NA KOZHU EKSPERIMENTAL'NYKH ZHIVOTNYKH].
Yu. A. Medevedev.
Gigiena Truda i Professional'nye Zabolevaniia, vol. 8, Aug. 1964, p. 12–18. 5 refs. In Russian.

Clinical and post-mortem tissue studies of rabbits after skin applications of lethal doses (1,200 milligrams per kilogram of body weight) of isopropylbenzene hydroperoxide revealed necrosis of skin and edema involving subcutaneous fatty tissue. The general toxic effect of the compound was characterized by hemolysis combined with metabolic disturbance resulting in dystrophic changes of internal organs.

A64-81101
THE STATE OF THE ORGAN OF VISION IN PERSONS HANDLING TETRAETHYL LEAD AS SHOWN BY DYNAMIC OBSERVATIONS [SOSTOIANIE ORGANA ZRENIIA U RABOTAIUSHCHIKH S TETRAETILSVINTSOM, PO DANNYM DINAMICHESKIKH NABLIUDENII].
N. D. Mel'nikova.
Gigiena Truda i Professional'nye Zabolevaniia, vol. 8, Aug. 1964, p. 41–43. 6 refs. In Russian.

Periodic medical examinations of individuals exposed to tetraethyl lead compounds in the course of their work disclosed the following toxic effects: (1) the compound affected primarily the central nervous system and the centers controlling body functions; (2) the visual apparatus was affected to a large degree; (3) the eye fundus indicated circulatory disturbances; (4) the ophthalmic tonus was increased; (5) intraocular pressure was increased, but this did not affect visual function; (6) the increase in ephthalmotonus was the result of a disturbance of the nervous system which regulates the intraocular pressure.

A64-81102
DIRECT AND REFLEX EFFECTS OF HYPOXIA, HYPOTENSION AND HYPOTHERMIA ON THE HEART.
Paul A. Ebert, W. Gerald Austen, Lazar J. Greenfield, Harvey W. Bender, and Andrew G. Morrow (Nat. Heart Inst., Clin. of Surgery, Bethesda, Md.)
American Journal of Medical Electronics, vol. 3, Jul.-Sep. 1964, p. 162–168. 15 refs.

The direct and reflex effects of hypoxia, hypotension, and hypothermia on the hearts of dogs were evaluated using two separate extracorporeal

circuits. Hypothermia directly slowed the heart but no reflex effects were noted. Systemic hypotension produced a sinus bradycardia but did not result in cardiac arrest. Systemic hypoxia, however, caused severe arrhythmias, which sometimes lead to cardiac arrest. These effects were more profound when systemic desaturation was rapidly induced and were most deleterious when the heart was hypoxic as well.

A64-81103
PHYSIOLOGICAL CHANGES IN AN ORGANISM DURING THE PROCESS OF ACCLIMATIZATION IN THE FAR NORTH [FIZIOLOGICHESKIE SDVIGI V ORGANIZME CHELOVEKA V PROTSESSE AKKLIMATIZATSII NA KRAINEM SEVERE].
I. S. Kandror.
IN: HUMAN HEALTH IN THE FAR NORTH [ZDOROV'E CHELOVEKA NA KRAINEM SEVERE]; Proceedings of the Meeting of the Academy of Medical Sciences and of the Ministry of Health USSR, in Murmansk, Jun. 22–24, 1961.
Edited by N. N. Litvinova (USSR, Akad. Med. Nauk, Moscow).
Moscow, Gosudarstvennoe Izdatel'stvo Meditsinskoi Literatury, 1963, p. 13–27. In Russian.

During acclimatization of the human organism to arctic conditions, physiological factors, such as basal metabolic rate and cardiovascular and respiratory system functions must be considered. While permanent residents of the north have metabolic rates higher than individuals of temperate zones, persons recently arrived in arctic regions undergo a drop in metabolic rate, which persists for several years. The process of acclimatization may be considered an activity controlled by the thermoregulatory mechanism, which is governed by the cerebral cortex centers. In permanent residents, this mechanism becomes automatic. Newly arrived subjects become either hypothermic or hyperthermic and subsequently develop trophic disturbances of the upper respiratory tract, the muscular system, the neural trunks and ganglia, and the internal organs. The differences in somatic and peripheral temperatures cause an overload of nonconditioned reflex functions of the nervous system. The excessive respiratory volume decreases the period of pulmonary rest changing the disposition and size of the thoracic cavity and resulting in a stasis of pulmonary circulation, hyperemia of the lungs and liver, decrease in blood flow rate, and fragility of the capillaries. Prolonged days or nights produce a stress on the nervous system.

A64-81104
PROBLEMS OF ACCLIMATIZATION OF RESIDENTS OF THE KOLA PENINSULA [OSOBENNOSTI AKKLIMATIZATSII NASELENIIA NA KOL'SKOM POLUOSTROVE].
V. Ya. Chekin.
IN: HUMAN HEALTH IN THE FAR NORTH [ZDOROV'E CHELOVEKA NA KRAINEM SEVERE]; Proceedings of the Meeting of the Academy of Medical Sciences and of the Ministry of Health USSR, in Murmansk, June 22–24, 1961.
Edited by N. N. Litvinova (USSR, Akad. Med. Nauk, Moscow).
Moscow, Gosudarstvennoe Izdatel'stvo Meditsinskoi Literatury, 1963, p. 28–37. In Russian.

A survey of physiological changes in subjects who underwent a process of acclimatization to subarctic atmospheric conditions disclosed two types of individual reactions. One group of persons underwent a gradual reorganization of the adaptive mechanisms after a short period of disturbances in functions of the cortex, subcortical centers, of the autonomic nervous system, the hypothalamus, and the endocrine system. The second group of individuals developed disturbances of the nervous and endocrine systems which caused fatigue, drowsiness, general weakness, myalgia, arthalgia, and cardialgia. The majority of individuals developed various degress of thyroid gland hypertrophy and disturbances of adrenal functions. Even healthy adequately fed individuals required an additional supplementary intake of vitamin C. An extended drop of atmospheric pressure in connection with periodic seasonal changes may result in increased blood pressure, which could persist for months.

A64-81109
CARBON DIOXIDE MEASURING SYSTEMS FOR MANNED SPACECRAFT.
William H. Bush. (NASA Manned Spacecraft Center, Houston, Tex.)
Aerospace Medicine, vol. 35, Oct. 1964, p. 951–953.
Contracts No. NAS9-170; NAS9-349; NAS9-1191; NAS9-1199; and NAS9-2255.

For manned spaceflight to date, three types of CO_2 sensors were developed. At present, the infrared approach to CO_2 detection is considered the most reliable and sensitive system available for use in manned spaceflight. The problems of total pressure sensitivity can be offset electronically, if required, on future missions; however, at present the excellent pressure control which the environmental system supplies the spacecraft makes such refinements unnecessary for normal operations.

A64-81110
ELECTRONIC BLOOD PRESSURE SAMPLER AND PRINTER.
Victor W. Bolie (Autonetics, Bionics, Res. and Develop. Div., Anaheim, Calif.) Richard J. Gowen (USAF Acad., Colorado Springs, Colo.), Jerry R. Tennant, and Duane E. Sander (Iowa State U., Dept. of Elec. Engr., Ames).
Aerospace Medicine, vol. 35, Oct. 1964, p. 954–957. Iowa Methodist Hosp., Des Moines and Iowa State Dept. of Health supported research.

A device for automatic blood-pressure measurement from the finger is described. A pair of digital voltmeters are located in the bottom of the chassis to digitize the systolic and diastolic pressure levels by converting an analog pressure signal at the appropriate time. A digital printer located at the chassis midlevel prints on paper tape the systolic and diastolic digital voltmeter readings in paired sequence at the end of each measurement cycle. The module at the top of the chassis interlinks the digital voltmeters and printer with the finger unit, and contains (1) a small air pump to slowly inflate a proximal-phalanx cuff in the finger unit, and (2) an electric circuit to transilluminate the fingertip and process the fingertip signals. A master switch is located on the front panel of the top module. The only other control needed after inserting a finger into the finger unit is a pushbutton switch, also located on the top module panel. Diagrammatic representations of various components of the device are presented. Blood pressure measurements taken by the conventional auscultation method and by the automatic equipment were compared. Separate test showed the automatically determined readings correlated well with the gravity level of the finger above and below the level of the heart.

A64-81114
CHANGES IN HEART RATE AND PERFORMANCE AS A RESULT OF LOSS OF SLEEP.
D. W. J. Corcoran (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Gt. Brit.).
British Journal of Psychology, vol. 55, Aug. 1964, p. 307–314. 20 refs.

Two theories of the effects of loss of sleep were compared against existing facts. The hypothesis that sleep deprivation reduces arousal was judged to be more adequate than the theory that arousal is increased by loss of sleep, the former failing only to account for raised physiological indices of arousal in some experiments. These are attributed to experimental conditions which compel the subject to make compensatory efforts to maintain adequate levels of performance. Under such conditions, effort, not arousal, is reflected in the indices. An experiment was conducted in which a constant high level of performance was not demanded of the subjects over a 60-hour period without sleep. Heart rate and performance fell with loss of sleep.

A64-81115
PERCEPTION OF VERTICALITY IN ADULT LIFE.
Ann D. M. Davies (Med. Res. Council Unit for Res. on Occupational Aspects of Ageing, Liverpool) and G. W. H. Leytham (Liverpool U., Dept. of Psychol., (Gt. Brit.)
British Journal of Psychology, vol. 55, Aug. 1964, p. 315–320.

Comalli, Wapner, and Werner's (1959) developmental study on the perception of verticality was repeated and extended using eight men and eight women matched for distribution of intelligence in each of the age decades from 20 to 29 to 70 to 79. Following Comalli et al., subjects were seated in a dark room in the upright position or tilted at ± 30°. They were asked to adjust a luminescent rod set initially at ± 10° or ± 30°, until they thought it was upright. Estimates of verticality were found to depend on the starting position of the rod and to be related to nonverbal intelligence. The subjects, unlike Comalli et al., located the vertical to the side opposite to the body tilt throughout the 20 to 79 range.

A64-81116
LACK OF ARTIFICIAL ACCLIMATIZATION TO HEAT IN PHYSICALLY FIT SUBJECTS.
J. E. Greenleaf (Ill. U., Dept. of Physiol. and Biophys., Urbana).
Nature, vol. 203, Sep. 5, 1964, p. 1072. 5 refs.

During investigations of artificial acclimatization to heat on three physically fit subjects, the usual changes in sweat rates, rectal temperatures, and pulse rates were not observed. The acclimatization procedure consisted of five 2-hour walks on an every-other-day sequence. The daily protocol was 50 minutes walking at 6.4 km./hour on a level treadmill and 10 minutes rest each hour. The environmental conditions were dry bulb = 49°C., wet bulb = 28°C., and globe temperature = 49° C. Comparing the results of walk 1 with walk 5, the average pulse rate decreased 1 beat/minute; the sweat rate decreased 66 grams/hour, and the rectal temperature decreased 0.3° C. These results are compared with those of other investigators. The relationship between exercise heat and environmental heat on the response of the subject is discussed.

A64-81117
SOME NEGATIVE RESULTS IN THE SEARCH FOR A LETHAL EFFECT OF MAGNETIC FIELDS ON BIOLOGICAL MATERIALS.
Eric J. Hall, Joel S. Bedford (Churchill Hosp., Radiotherapy Dept., Oxford), and Michael J. M. Leask (Oxford U., Clarendon Lab., Gt. Brit).
Nature, vol. 203, Sep. 5, 1964, p. 1086–1087. 5 refs.

Three separate experiments were performed using HeLa cells cultured in vitro. In each experiment 200 cells were inoculated in either 50 mm. "Falcon" plastic Petri dishes or in "Falcon" plastic culture flasks. The cells were then placed in an incubator for 10 days at 37° C. continuously flushed with a mixture of 5% carbon dioxide and 95% air. At the end of this period the cells were fixed with 10% formalin in normal saline, stained with crystal violet, and the number of macroscopic colonies on each dish or flask was counted. In each experiment 2 containers were reserved for controls and 2 were subjected to either: (a) a field strength of 5,000 Gauss for 10 days, (b) a field strength of 27,000 Gauss for 1 hour, or (c) a field strength of 77,000 Gauss for 15 minutes. No significant differences were observed in treated and control flasks either in cell number or morphology. It is concluded that gross lethal effects on mammalian cells are not produced either by powerful magnetic fields applied for short periods, or by lower ones extending over many cell generations.

A64-81118
A PERSISTENT DIURNAL RHYTHM IN PHOTOSYNTHETIC CAPACITY.
John D. Palmer (N.Y. U., Dept. of Biol., University Heights), Laura Livingston (Yale U., Dept. of Biochem., New Haven, Conn.), and Dennis Zusy (Northwestern U., Dept. of Biol., Evanston).
Nature, vol. 203, Sep. 5, 1964, p. 1087–1088. 8 refs. NIH and U. of Ill. supported research.

Pure cultures of algae, Phaeodactylum tricornutum, were grown in Guillard's medium and maintained in a light regime of 12 hours of illumination alternating with 12 hours of darkness. When the cultures approached the stationary phase of growth, periodic measurments of photosynthesis were commenced. At the midpoints of each light and dark period, three of four 10-milliliter samples were withdrawn from a parent culture and incubated. The latter procedure is described. Photosynthesis was maximal during the light period, the difference being more than threefold. Cultures were then grown in alternating cycles of light and darkness for 10 days and then placed in either continuous darkness or in various intensities of continuous light. In constant darkness the rhythm is not expressed. At 20 foot-candles, one oscillation, about halved in amplitude, occurs, and then all indication of the rhythm disappears. At 40 and 80 foot-candles, the rhythm persists for at least 3 cycles and is characterized by a gradual damping out. As is universally the case in biological rhythm, continuous bright light (600 foot-candles) inhibits the expression of the rhythm. The photosynthetic rhythm could well be an indirect result of an underlying rhythm in photosynthetic-pigment content. The data also suggest a rhythm in cell division, since virtually all increases in cell number took place during the last half of the dark period and the first half of the light period. Population increases also continued to take place in the same manner in constant conditions.

A64-81119
ON THE NATURE OF THE FREE RADICALS OF THE COLD BOKKEVELD METEORITE [SUR LA NATURE DES RADICAUX LIBRES DE LA METEORITE COLD BOKKEVELD].
Jules Duchesne, Joseph Depireux, and Clotilde Litt (Liege U., Dept. de Phys. Atomique et Moléculaire; Inst. d'Astrophys., Cointe-Sclessin, Belgium).
Comptes Rendus des Seance de l'Academie des Sciences, vol. 259, Sep. 14, 1964, p. 1891–1893. 5 refs. In French.

The authors show that the paramagnetic electron resonance signal linked to the free radicals of the Cold Bokkeveld meteorite presents numerous similarities with those characteristic for the carbons. They establish, among others, the existence of a striking analogy in the behavior of these two types of rocks toward ionizing radiations. The entire complex of correlations leads them to postulate that the carbon compounds constituting the meteorite in question are, at least partially, the result of biogenic activity.

A64-81120
ELECTRONYSTAGMOGRAPHIC ANALYSIS (ENG) OF THE CHARACTERISTICS OF NYSTAGMUS INDUCED BY COMPLEMENTARY CORIOLIS ACCELERATION [ANALISI ELETTRONISTAGMOGRAFICA (ENG) DEI CARATTERI DEL NISTAGMO INDOTTO DA ACCELERAZIONE COMPLEMENTARE DI CORIOLIS].
D. Megighian, G. A. Molinari, and C. Marchiori (Padova U., Ist. di Clin. Otorinolaringojatrica, Italy).
Bollettino della Societa Italiana di Biologia Sperimentale, vol. 40, Jun. 15, 1964, p. 545–548. 10 refs. In Italian.

Electronystagmographic studies were made on eight normal subjects rotated in a chair at an angular velocity of 90°/sec, with velocities of head flexion (forward and backward) between 30° and 90°/sec, until the nystagmic reaction of Coriolis acceleration was obtained. The movement of forward head flexion counterclockwise caused nystagmus directed towards the left; the opposite appeared during clockwise rotation. The nystagmus which appeared during these movements of head flexion tended progressively to wear off. After a brief pause, a different type of nystagmus appeared. The nystagmus of Coriolis acceleration was characterized by two distinct phases with jerks in opposite directions and with a pause of variable duration. The jerks were directed in the horizontal plane and exhibited characteristics different from those of nystagmus produced by the conventional methods of labyrinthine stimulation.

A64-81121
RELATIONSHIP BETWEEN ANOXIA AND BONE MARROW GRAFT IN WHOLLY IRRADIATED MICE [SUI RAPPORTI ESISTENTI TRA L'ANOSSIA E IL TRAPIANTO DI MIDOLLO OSSEO IN TOPI PANIRRADIATI].
G. Mazzella (Centro di Studi e Ricerche di Med. Aeronautica e Spaziale, Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 27, Apr.–Jun. 1964, p. 193–197. In Italian.

A series of experiments are reported which deal with the effects of anoxia on the growth of bone marrow transplants in mice totally irradiated with various ionizing radiations. Anoxia produced the following results: (1) increases in reticulocytes and leukocytes; (2) protection from radiation damage, but with no retention of immunizing powers; (3) a high percentage of survival in the animals; and (4) better growth of the bone marrow transplant, with a longer growth period.

A64-81122
BINOCULAR RIVALRY AND STEREOSCOPIC ACUITY.
Paul Enoksson (Gothenburg U., Dept. of Ophthalmol., Sweden; and Hosp. of Norrköping, Dept. of Ophthalmol., Norrköping, Sweden).
Acta Ophthalmologica, vol. 42, 1964, p. 165–178. 50 refs. Found. for Ophthalmol. Res. of H. Hierta, Stockholm; Found. of Ernst and Hilma Fredga, Norrköping; and the Swedish Scout Union supported research.

The literature on binocular rivalry as a factor in stereopsis is reviewed, as well as some different methods of measuring stereoscopic acuity. Stereoscopic acuity is determined with Monjé's stereoeidometer in 19 schoolgirls consistently showing binocular rivalry to optokinetic stimuli. A correlation is found between binocular rivalry and stereoscopic acuity, the depth acuity being better when the alternation in rivalry is rapid.

A64-81123
ELECTRONYSTAGMOGRAPHY.
L. B. W. Jongkees and A. J. Philipszoon (Amsterdam U., Ear-Nose and Throat Clinic of Wilhelmina-Gasthuis, Netherlands).
ACTA
Acta Oto-Laryngologica, Suppl. 189, 1964, 7 + 111 p.
Netherlands Organisation for the Advancement of Pure Res.; Amsterdam U.; and G. D. Searle and Co. supported research.

A method for quantitative measurements of passive eye movements in rabbits, as a measure of corneoretinal potential differences, is described. Electronystagmography can be valuable in attaining precise measurements applicable to studies of the labyrinth such as: (1) the establishment of a typical nystagmus pattern in order to distinguish between nystagmus and nystagmoid movements; (2) the effects of drugs on spontaneous and positional nystagmus; (3) caloric test of nystagmus; (4) effects of drugs on the vestibular apparatus; (5) torsion-swing test for prerotary nystagmus; (6) compensatory eye movements in parallel-swing test; (7) effects of linear simulation; (8) galvanic nystagmus; (9) compensatory eye movements in nystagmus caused by torsion of neck; and (10) effects of cinnarizine on vertigo.

A64-81124
FINGERTIP SIGHT: FACT OR FICTION?
D. Liddle.
Discovery, vol. 25, Sep. 1964, p. 22–26.

Extraocular vision is discussed citing the well-publicized case of Rosa Kuleshova in Russia, experiments of Dr. Jules Romain, Mrs. Stanley in New York, etc. On the basis of more than fifty recorded cases of people perceiving color through "touch" it is possible to reject tactile and temperature cues as the important factors. Arguments are also raised against telepathy, supernatural powers, hoax, etc. A case against skin vision is suggested by the lack of any known neural structure in the skin which resembles a lens although some structures may be sensitive to light. The reports indicate that perception is adversely affected by skin that is too cold or too dry, by light reaching the eyes, or by emotional disturbances. Another feature highlighted by

many reports is an association with abnormal mental states. A series of experiments conducted by the author, who is totally blind, yielded statistically significant results with black and white cards by a method which excluded touch.

A64-81125
THE EFFECT OF INHALING COLD AIR UPON PULMONARY VENTILATION IN MAN (INFLUENCE DE L'INHALATION D'AIR FROID SUR LA VENTILATION PULMONAIRE CHEZ L'HOMME).
A. Chassain and E. Florentin (Fac. de Méd., Lab. de Physiol. and Lab. Physiol. appl., Paris, France).
Journal de Physiologie, vol. 56, Mar.–Apr. 1964, p. 193–211. 21 refs. In French.

Ventilation in three males and one female at rest was measured by means of plethysmography. The entire body was exposed to room temperature (23° C); only the inspired air was subjected to temperature changes with time. Inhalation of cold air (4° C) caused a decrease in respiratory rate and an increase in tidal volume. The reverse was observed when changing from cold air to room temperature. No significant variations were found in the alveolar ventilation. Analysis of these results indicates that motor respiratory coordination (probably proprioceptive) works in such a way that during spontaneous or induced ventilatory changes the spirogram is modified, but alveolar ventilation is only slightly affected if at all. With regard to the mechanism of the action of cold air, two hypotheses are presented. The first and most probable concerns the direct action of cutaneous and mucous thermoreceptors on the respiratory centers. These receptors are numerous in the area of the trigeminal nerve and can elicit numerous vasomotor reflexes. The second hypothesis involves the effect of cold on the respiratory centers by utilizing different pulmonary tensioreceptors according to the following scheme: local vasomotor reflex, change in the level of passage of upper air pathways, and changes in resistance to the passage of ventilated gas.

A64-81126
ORIGIN OF LIFE AS THE FROBLEM OF FORMATION OF MACROMOLECULES.II. [L'ORIGINE DELLA VITA COME FROBLEME DELLA FORMAZIONE DI MACROMOLECOLE. II.]
F. Cedrangolo (Naples U., Ist. di Chim. Biologica, Italy).
Scientia, vol. 99, Apr.–May 1964, p. 75–91. In Italian.

Possible biochemical mechanisms are presented by which the protein and nucleic acid macromolecules interacted to originate life on Earth. Two hypotheses are given for the origin of life from macromolecules. The first deals with the possible synthesis of amino acids and organic substances of low molecular weight during a given time period on Earth, and the second supposes that the protein macromolecule appeared first following that of nucleic acids. Theoretical considerations are advanced on the formation of the nucleic acid macromolecule, the role of nucleic acid in protein synthesis, and the interrelationships between nucleic acid and protein synthesis. Regarding the role of deoxyribonucleic acid and ribonucleic acid in protein synthesis, a schematic analysis is given of the mechanism which includes the following three steps: (1) activation of amino acids; (2) transport of activated amino acids through soluble ribonucleic acid; and (3) condensation of amino acids in protein on the surface of ribosomes. Various representative diagrams and figures are included.

A64-81127
NEUROVEGETATIVE CONDITIONS AND OCCUPATIONAL PATHOLOGY [ORIENTAMENTO NEUROVEGETATIVO E PATOLOGIA PROFESSIONALE].
Giuseppe Pozzi (Ist. de Med. Ind., Genoa, Italy).
Rassegna di Medicina Industriale e di Igiene del Lavoro, vol. 33, Jan.–Apr. 1964 p. 194–199. 24 refs. In Italian.

A change in the normal physiological equilibrium of the neurovegetative system predisposes an employee to various functional and organic psychosomatic disorders that can affect work performance. For example, mental fatigue can affect the cardiovascular, respiratory, and digestive systems; cerebral hemodynamics; the blood picture; metabolism; and muscular activity. Insomnia, headache, asthenia, neuroses, and occupational allergic disorders (asthma, dermatoses) have a neurovegetative basis. Persons most susceptible to neurovegetative disorders are those working under the effects of noise or vibrating instruments, exposed to acute or chronic occupational poisoning (lead, mercury, manganese, etc.), or exposed to decompression hazards. The therapeutic, medicosocial, and preventive aspects of neurovegetative disorders as related to occupational medicine are discussed.

A64-81128
CLINICAL EVALUATION OF BODY WEIGHT [VALUTAZIONE CLINICA DEL PESO CORPOREO].
Salvatore Principe.
Rassegna di Medicina Industriale e di Igiene del Lavoro, vol. 33, Jan.–Apr. 1964, p. 201–214. 22 refs. In Italian.

A review is presented of recent research which indicates no appreciable correlation between body weight and height, rather a correlation between weight and thoracic perimetry. On this basis, an attempt is made to estimate body weight according to height and thoracic perimetry, alone and together. Theoretical calculations are made using three different regression equations with three groups of subjects having little, average, and large body weight. The results show that the best weight predictions were obtained when based on thoracic perimetry. This technique for body weight estimation can be useful in clinical practice and in general, industrial, sports, and legal medicine. Included are tables of arithmetic averages of actual and theoretical body weight calculations based on 100 male subjects.

A64-81129
MEASUREMENT OF HEAD MOTION. I. A REVIEW OF METHODS OF MEASURING JOINT MOTION.
Joseph J. Defibaugh (V. A. Hosp., Livermore, Calif.)
Physical Therapy, vol. 44, Mar. 1964, p. 157–163. 43 refs. Office of Vocational Rehabil. supported research.

Methods of measuring joint motion as applied to head motion are reviewed. None of the methods described was considered entirely satisfactory for clinical measurement of head motion. Visual estimation of the joint angle lacks the accuracy and objectivity required for joint evaluation. Radiographic methods are not readily available in all clinics and they are expensive and potentially dangerous for repeated use. Photographic methods are also expensive. The accuracy of schematography and outline tracings depends upon how close the part being measured can be placed to the tracing surface. Anatomically it is not possible to place the head sufficiently close to the tracing surface. Since the head moves on a combination of axes in the cervical spine, the trigonometric method which measures a single angle is not applicable for measuring head motion. The accuracy of head motion measurement with the protractor and projector depends on the ability of the observer to estimate the joint axis. However, the pendulum goniometer method for measuring total range of head motion is reliable.

A64-81130
MEASUREMENT OF HEAD MOTION. II. AN EXPERIMENTAL STUDY OF HEAD MOTION IN ADULT MALES.
Joseph J. Defibaugh (V. A. Hosp., Livermore, Calif.)
Physical Therapy, vol. 44, Mar. 1964, p. 163–168. 10 refs. Office of Vocational Rehabil. supported research.

This study investigated the use of the lower surface of the upper teeth as a plane by which head motion could be measured. A head goniometer was designed, and the subjects were placed in a posture which adequately stabilized the upper trunk. Thirty male subjects between the ages of twenty and forty were tested. The mean neutral head position of these subjects was found to be at a point of .06 degrees of flexion (i.e., the plane of the lower surface of the upper teeth varied on the average .06 degrees from horizontal when the subjects were upright, looking forward). Taking as a zero position a head posture in which the lower surface of the upper teeth was exactly horizontal, head motion of fifteen subjects in three planes was measured and remeasured by the author to determine the reliability of this method of measurement. Head motion of fifteen subjects was measured by the author and remeasured by alternate observers to determine the objectivity of the method. In all, nine different positions of head motion were measured and remeasured. The correlation coefficients between the means of the measurements and remeasurements of each position of head motion indicated that this method of measuring head motion is moderately to highly reliable (r = .711 to .909) and objective (r = .660 to .939).

A64-81131
DRIVING REACTION AS A FUNCTION OF INTENSITY OF FLICKERING LIGHT STIMULUS [REAKTSIIA NAVIAZYVANIIA RITMA KAK FUNKTSIIA INTENSIVNOSTI MEL'KAIUSHCHEGO SVETOVOGO RAZDRAZHITELIA].
V. D. Nebylitsyn (RSFSR Acad. of Pedagogical Sci., Inst. of Psychol., Moscow, USSR).
Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 14, Jul.–Aug. 1964, p. 569–576. 13 refs. In Russian.

A sensor-modulator system may be utilized to study the relationship of rhythm summation and intensity of a repetitive visual stimulus in investigations pertaining to biopotentials of the brain. This relationship may be expressed as an asymptotic function of the stimulus intensity. Study of the individual graphs revealed the presence of basic types of relationships between type of graph and nervous system tolerance.

A64-81132
EFFECTS OF RESERPINE AND CHLORPROMAZINE ON RATS SUBJECTED TO EXPERIMENTAL STRESS.
Joseph P. Buckley, Hitoshi Kato, William J. Kinnard, Mario D. G. Aceto, and Jose M. Estevez (Pittsburgh U., School of Med., Pa.)
Psychopharmacologia, vol. 6, 1964, p. 87–95. 12 refs.
Grant No. NIMH-G-MH-04511-03.

Male rats were subjected to a variable stress program six days per week, four hours per day. The blood pressure of all animals markedly increased with the peak pressor response occurring during the eleventh week. There was no significant difference between the blood pressures of rats receiving saline, 1.0 ml/kg intraperitoneally; reserpine phosphate, 0.1 mg/kg intraperitoneally; and chlorpromazine hydrochloride, 4 mg/kg, intraperitoneally. Both compounds not only failed to decrease the pressor effects induced by the stressors but also appeared to potentiate the lethal effects of the stressors. Reserpine increased mortality to stress by over 200% and chlorpromazine increased the mortality rate by approximately 100%. All stressed animals dying during the experiment demonstrated marked vacuolization of the three layers of the adrenal cortex with severe congestion of the sinusoids of the zona reticularis. The reserpine-treated animals also demonstrated possible necroses of the outer layers of the zona fasciculata.

A64-81133
LOCAL REGULATION OF BLOOD FLOW IN SKELETAL MUSCLE.
Richard D. Jones and Robert M. Berne (Western Reserve U. School of Med., Dept. of Physiol.; and St. Luke's Hosp., Dept. of Surgical Res., Cleveland, Ohio).
Circulation Research, vol. 15, Supplement No. 1, Aug. 1964, p. 30–38. 14 refs. Elisabeth Severance Prentiss Found. supported research.
Grants No. NIH-G-H-1928 and NIH-G-H-6031.

The vessels of skeletal muscle were found to respond in various ways (passive, essentially rigid, autoregulatory, or intermediate) to allow alterations of perfusion pressure or to the inflow of blood. Autoregulation predominated, and this behavior of the vessels was characterized by a high intrinsic vascular tone and low oxygen level in venous blood. Acute or chronic denervation did not alter the average vascular resistance or the extent of autoregulatory adjustment, but did result in fewer passive responses of the vessels. Autoregulation was initiated more rapidly and the extent of the change in resistance was greater in contracting muscle than in resting muscle. The absence of an increase in resistance at equilibrium during vascular distention produced by elevation of venous pressure, and the absence of a decrease in resistance at equilibrium following reduction in venous pressure, lead to the conclusion that the metabolic regulation of blood flow predominates in skeletal muscle in the absence of extrinsic neural stimuli.

A64-81134
DESCRIPTION OF A CENTRAL MECHANISM RELATED TO DIVERSE BRIGHTNESS PHENOMENA.
Thomas M. Nelson and S. Howard Bartley (Mich. State U., Dept. of Psychol., East Lansing).
Journal of Psychology, vol. 58, Oct. 1964, p. 379–395. 33 refs.
Grant No. NSF-G-G-19485.

A number of findings and formulations exist in the literature on brightness produced either by continuous or intermittent inputs. They have never been put into a single description of optic-pathway activity. For this purpose, a mechanism that interrelates findings such as expressed in the Broca-Sulzer effect, the Brücke-Bartley effect, and the Talbot-Plateau law was described. Findings indicating that the Talbot-Plateau law fails for brief durations of intermittent input were included.

A64-81135
EVOKED RESPONSES TO NUMERICAL AND NON-NUMERICAL VISUAL STIMULI WHILE PROBLEM SOLVING.
Robert M. Chapman and Henry R. Bragdon (Inst. for Behavioral Res.; and Walter Reed Army Inst. of Res., Wash., D.C.)
Nature, vol. 203, Sep. 12, 1964, p. 1155–1157. 7 refs.
Grant No. PHS-G-NB-03590.

Subjects were instructed to solve simple problems that required the perception of numerical visual stimuli presented in sequence. Other nonmeaningful visual stimuli appeared regularly in the stimulus sequence. Electrical responses evoked by these stimuli and eye movements were recorded. Also the subject's performance was monitored. The evoked responses were consistently different to the numbers and to the blank stimuli. Although the physical intensity of the blanks was approximately four times greater, the responses to the numbers were larger in all subjects tested. Monocular data with the use of cycloplegic drugs exclude changes in pupil size or accommodation as causal factors. Eye movements were also ruled out since they were not consistently correlated with the size or waveform of the evoked responses. Further, neither alpha activity nor electroretinograms were related to the differential evoked response. It is concluded that the differences in central evoked responses to number and blank stimuli are not due to peripheral mechanisms.

A64-81136
ADULT PERCEPTION OF THE HORIZONTAL.
Freda Rebelsky (Boston U., Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 371–374.

Perception of the horizontal was tested by having 128 male and female university students draw the water on pictures of tilted glasses, as if the glasses were half-filled with water. Most subjects made errors of more than 5°, which suggests that adults have difficulty, much as children do, with the concept of horizontality as tested by this task.

A64-81137
CHANGES IN DISTANCE JUDGMENTS AS A FUNCTION OF CORRECTED AND NONCORRECTED PRACTICE.
Joachim F. Wohlwill (Clark U., Worcester, Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 403–413. 7 refs.
Grant No. NSF-G-G-16031.

Changes in distance bisections as a function of practice were studied, two practice variables being manipulated in a 2 X 3 factorial design. One was the feedback variable: correction versus noncorrection; the other was type of practice: fractionation, bisection with shifting angle of regard, and control (continued bisection practice under standard conditions). Learning effects were measured in terms of judgments made on a set of pre- and post-tests, involving bisections of the training distance as well as two new distances, and size matches. Subjects were 48 undergraduates. It was found that correction produced a largely ephemeral attenuation of the overconstancy bias which marked all judgments; its effect transferred only to a limited extent to the new distances, and not at all to the size judgments. Type of practice did not result in any significant effects. A nonperceptual, judgmental explanation for the changes produced, and the overconstancy bias itself, is suggested.

A64-81138
MOTOR SKILLS BIBLIOGRAPHY: XLIII. PSYCHOLOGICAL ABSTRACTS, 1963, VOLUME 37, SECOND HALF.
C. A. Ammons and R. B. Ammons (Mont. State U., Missoula).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 415–418. 102 refs.

An alphabetical listing by authors of 102 articles investigating various skills is presented. Included in this group are studies on motion skills, reaction time, psychomotor performance, confinement, vibration, and weightlessness.

A64-81139
NOTE ON PERCEPTION OF MEAN SIZE FROM NORMAL AND RECTANGULAR DISTRIBUTIONS OF SIZES.
Robert E. Lubow (N.C.U., State Coll., Raleigh).
Perceptual and Motor Skills, vol. 19, Oct. 1964 p. 419–422. 5 refs.
NIMH Award MH-K3-7189.

Estimation of the average size of texture elements in a visual pattern is necessary for the calculation of the slant of a static surface when a texture gradient is used as the stimulus for slant. This study concerned subjects' ability to estimate the mean size of elements composing two visual patterns where these patterns have the same size but the distributions of sizes are different, i.e., normal and rectangular. It was found that type of distribution did not affect the estimate of mean size. Results were discussed in relation to predicting slant estimates.

A64-81140
EFFECTS OF DELAY OF KNOWLEDGE OF RESULTS IN A LINE-DRAWING TASK.
James A. Dyal (Tex. Christian U., Fort Worth).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 433–434.

Previous experimentation has yielded contradictory results regarding the effects of delay of knowledge of results (KR) on the acquisition of a simple motor skill. The present experiment used 3 KR conditions: immediate KR, 30-second delay of KR, and no KR in a simple line-drawing task. The results confirmed the previous conclusion of Greenspoon and Foreman (1956) that delay of KR interferes with the acquisition of a line-drawing response.

A64-81141
EFFECT OF TIME-SHARING ON MONITORING PERFORMANCE: SIMPLE MENTAL ARITHMETIC AS A LOADING TASK.
Earl L. Wiener, Gary K. Poock, and Matthew Steele (Miami U., Coral Gables, Fla.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 435–440. 14 refs.
Grant No. PHS-G-AC-00126.

A three-group experiment was performed to evaluate the effect of a secondary task of simple mental arithmetic on visual monitoring performance. The primary task was detection of a slightly larger excursion of a voltmeter needle making 50 uniform excursions per minute.

The length of a vigil was 48 minutes, during which 32 signals were presented. The time-sharing group performed, in addition to the monitoring task, a secondary task of adding two one-digit numbers presented orally three times a minute. Two control groups, one with the numbers presented and one with only random noise, performed only the monitoring task. Results showed no difference in detection rate between groups, but a significant time decrement and no group-by-time periods interaction. Commissive errors were significantly higher in the time-sharing group than the control groups. The results are seen as contrary to the arousal theory of vigilance.

A64-81142
FIELD DEPENDENCE AND AROUSAL.
Philip K. Oltman (Yale U., New Haven, Conn.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 441.

Twenty subjects performed on the Rod and Frame Test in quiet and in loud, wideband noise. Performance was significantly more accurate in the noise trials. The results suggest that individual differences in field dependence may be due in part to differences in the level of physiological arousal, which in turn affects breadth of attention.

A64-81143
FASTER REACTION TIME THROUGH FACILITATION OF NEUROMUSCULAR JUNCTIONAL TRANSMISSION IN MUSCLES UNDER MAXIMAL STRETCH.
Leon E. Smith (Iowa State U., Iowa City) and Jim D. Whitley (Calif. U., Berkeley).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 503–509. 9 refs.

Fifty male students were volunteers in an experiment in which it was postulated that maximal muscular stretch would significantly increase the reaction time of an extended limb. Results substantiated the hypothesis. It was conjectured that the faster reaction time may be facilitated by the neuromuscular junctional transmission resulting from muscular stretch. Muscular stretch did not affect the movement time of the limb but had a negative influence upon the application of static strength. Relationships between "normal" (minimal stretch) and maximal stretch speeds with reaction time and static strength were found to be very low.

A64-81144
BUTTON-PRESSING FOR A TIME-OFF REWARD DURING SENSORY DEPRIVATION: IV. RELATION TO CHANGE IN RATINGS OF WELL-BEING.
Ascanio M. Rossi and Philip Solomon (Harvard Med. School, Cambridge; and Boston City Hosp., Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 520–522.
Grant No. Nonr-G-1866(29).

Fifteen subjects were given the opportunity to button-press for a promised time-off reward during a three-hour sensory deprivation (S-D) session. Before entering S-D, subjects rated their state of well-being by means of a semantic differential scale. Immediately after leaving S-D, subjects used a copy of the same scale to rate their state of well-being while in S-D. Comparison of self-ratings of subjects who button-pressed with those who did not suggested that, while there were no significant differences in well-being between groups before S-D, the button-pressers experienced a significantly greater decrement in well-being during S-D. A significant rho of .69 was found between button-pressing and a discomfort quotient derived from the self-ratings.

A64-81145
PSYCHOMOTOR TASK WITH PERFECT RECALL AFTER FIFTY WEEKS OF NO PRACTICE.
William C. Roehrig (N.Y. State Psychiat. Inst., New York City).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 547–550. 7 refs.
Grants No. NIH-G-M-872 and NIH-G-MH-03616.

Seven subjects were trained to varying extents on a difficult balancing task, and then tested after 50 weeks without practice. The learning curves of all but one subject continued after the hiatus as if there had been no break in training. The results were compared with those from other studies of long-term retention of motor skills, and various possible explanations for the unusually high retention were discussed.

A64-81146
PSYCHOLOGICAL EFFECTS OF HYPOXIA: REVIEW OF CERTAIN LITERATURE FROM THE PERIOD 1950 TO 1963.
G. S. Tune (Harvard U., Cambridge, Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 551–562. 50 refs.

The effects of hypoxia on human behavior are reviewed under the headings: sensory function, performance, and cognitive and other effects. It is noted that there is some conflicting experimental evidence and that investigators have tended to disregard contemporary developments in psychology. Suggestions for ameliorating this situation are made along with a plea for more rigorous experimentation.

A64-81147
EFFECT OF HIGH AND LOW MOTIVATION ON TWO ASPECTS OF ATTENTION.
H. J. McNamara and R. I. Fisch (Menninger Found.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 571–578. 12 refs.
Grant No. PHS-G-MH-03924.

Two procedures were carried out to evaluate the effect of motivational intensity and relevance on attention. The experiment was designed to test the hypothesis that intense motivation acts consistently to reduce the number of cues utilized in a learning and/or performance task when these cues are relevant to the completion of a task. The results of the present study point to the existence of two functionally independent processes: (1) a span of attention process, concerned with the extent and breadth of attentional activity directed to stimuli which are relevant to a task; and (2) a scanning process, related to the fixation and recall of specific cue stimuli relevant to a task. It is this latter process which was postulated to be disrupted by high motivation.

A64-81148
REACTION TIME TO CUTANEOUS ONSET AND OFFSET STIMULATION.
Thomas G. Sticht (Ariz. U., Tucson).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 611–614. 7 refs.
Grant No. NSF-G-GB-1384.

Reaction times to the onset and the termination of mechanical cutaneous stimuli were obtained using two amplitudes of skin deformation. In all cases, the median onset reaction times were faster than the termination reaction times. These differences are attributed to differential rates of movement of the skin following the onset or termination of the stimulus.

A64-81149
PERCEPTION BIBLIOGRAPHY: XV. BALDWIN'S DICTIONARY, 1893–1904.
C. H. Ammons and R. B. Ammons (Mont. State U., Missoula).
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 400–402. 81 refs.

A list of 81 items for 1893 to 1904 on auditory and visual perception is presented.

A64-81150
PHENOMENAL TIME AS A DETERMINANT OF CFF
Bruce Denner and Seymour Wapner (Clark U., Worcester, Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 653–654.
Grant No. PHS-G-MH-00348.

Critical flicker frequency thresholds were obtained from 24 adults before and after working on timed tasks, where the phenomenal time was manipulated by using (a) an artificially speeded up clock, (b) an artificially slowed down clock, and (c) normal time. The results indicate that the experimental manipulation of phenomenal time increases sensitivity to the temporal discreteness of successive stimuli. These data are related to earlier findings on the role of internal rhythms in determination of critical flicker frequency and time perception.

A64-81151
REACTION TIME AND THE EXPECTANCY HYPOTHESIS.
Lewis R. Aiken, Jr. (US Navy Electron. Lab., San Diego, Calif.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 655–661. 11 refs.

The measurement and meaning of the term expectancy and equivalent concepts as used in areas such as learning and vigilance are discussed briefly, and some experiments designed to measure the temporal course of expectancy are reviewed. A visual reaction time experiment is reported in which the effects of 1, 2, 3, or 4 recurrences of 2-, 3-, 4-, or 5-second training intervals on reaction time to a single test stimulus appearing 2, 3, 4, or 5 seconds after the last training stimulus, were investigated. The results showed an insignificant effect of number of training intervals, but both the training and test interval effects and the interaction between the two were statistically significant. Under the conditions employed in the present experiment, mean reaction time is a minimum when the training and test intervals are equal and increases as the absolute difference in duration of training and test intervals increases. Since expectancy in this investigation was operationally defined as the reciprocal of reaction time, the results obtained here are consistent with those of several previous investigations of the temporal course of expectancy.

A64-81152
NITROPROPANE POISONING [INTOXICATION PAR LE NITROPROPANE].
M. Gaultier, P.-E. Fournier, P. Gervais, and C. Sicot (Hosp. Fernand Widal, Clin. Toxicol., Paris, France).
Archives des Maladies Professionnelles de Médecine du Travail et de Sécurité Sociale, vol. 25, Jul.–Aug. 1964, p. 425–428. In French.

Two cases are reported of 2-nitropropane poisoning. In the one case there appeared fatal toxic hepatitis of the cytolytic type with significant and diffuse sclerotic lesions. Various profound electroencephalographic changes were found even during the period when the subject was conscious. In the second case, the hepatitis was less severe, but the electroencephalogram showed the presence of disturbances in spite of the absence of clinical signs. The importance of alerting persons to the dangers of working with 2-nitropropane is stressed, along with control measures for polluted atmospheres. The tolerance level of 50 ppm proposed by American hygienists conforms with experimental studies on cats, rabbits, rats, and guinea pigs.

A64-81153
DEVELOPMENT IN ELECTROENCEPHALOGRAPHIC RESEARCH IN FATIGUE [L'ORIENTATION DES RECHERCHES ELECTROENCEPHALOGRAPHIQUES DANS LA FATIGUE].
H. Desoille, J. P. Cretel, R. A. Pinchon, and A. Bourguignon.
Archives des Maladies Professionnelles, de Médecine du Travail et de Sécurité Sociale, vol. 25, Jun. 1964, p. 299–302. In French.

A review of the literature dealing with electroencephalographic (EEG) studies made during fatigue induced either by muscular work (rats, humans), mental work (humans), or sleep deprivation (humans) is presented. During insomnia, EEG tracings indicated that fatigue decreased the amplitude of brain waves and the proportion of alpha waves. On the contrary, fatigue induced by short tests of physical or mental work produced an increase in alpha-wave tracings.

A64-81154
EFFECT OF FATIGUE DUE TO SLEEP DEPRIVATION ON THE HUMAN ELECTROENCEPHALOGRAM (EFFETS DE LA FATIGUE PAR PRIVATION DE SOMMEIL SUR L'ELECTROENCEPHALOGRAMME HUMAIN).
H. Desoille, R. A. Pinchon, G. Faivre, and A. Bourguignon (Inst. d'Hyg. Ind. et de Med. du Travail, Paris, France).
Archives des Maladies Professionnelles, de Médecine du Travail et de Sécurité Sociale, vol. 25, Jun. 1964, p. 303–314. In French.

Fatigue induced by sleep deprivation (25 to 33 hours) modified qualitatively the base rhythm of the electroencephalograph (EEG) to the maximum in a third of the 14 cases studied. In all subjects, fatigue induced a significant unsteady variation in the latency times of blockage and of return of the alpha rhythm. These two latency times varied generally in an inverse sense. Half of the subjects increased the blockage latency of the alpha and decreased the latency of its return. The other half of the subjects presented inverse changes. All, or nearly all, subjects under the effect of this type of fatigue showed an increase in the number of nonreactions to closing of the eyes or to darkening of the experimental chamber. As in previous works where different authors showed that a hundred hours of sleep deprivation was necessary to obtain a constant morphological modification of the EEG tracing, it is postulated that measurement of latencies of blockage and of return of alpha rhythm, and measurement of nonreactions, indicates a certain value of an EEG study of fatigue, and reveals the earliest variations in the morphology of base rhythm. The study of latency times permits the arrangement of subjects into two categories according to the increase or decrease of latency stop reaction caused by fatigue.

A64-81155
PROLONGED EXPERIMENTAL CARBON MONOXIDE POISONING (L'INTOXICATION EXPERIMENTALE PROLONGEE PAR L'OXYDE DE CARBONE).
H. Desoille, L. Truffert, J. Lebbe, R. Boncour, and C. Girard-Wallon (Inst. d'Hyg. Ind. et de Med. du Travail, Paris, France).
Archives des Maladies Professionnelles, de Médecine du Travail et de Sécurité Sociale, vol. 25, Jul.–Aug. 1964, p. 389–394. In French.

Rats, guinea pigs, and rabbits were exposed to carbon monoxide in an airtight chamber for six hours daily, five times per week to determine the toxic effects of confinement. Two different experiments were then conducted: (1) exposure of rabbits to an atmosphere containing a constant percentage of carbon monoxide, and (2) exposure of rabbits to a pure atmosphere of carbon monoxide several times daily. The first experiment revealed that in the rabbits no elevation of blood carbon monoxide persisted 48 hours after poisoning, and only several electroencephalographic and blood modifications were observed. It is suggested that a phenomenon of accommodation permitted the animals to support relatively light daily variations of atmospheric carbon monoxide. The second experiment was conducted for one hour, with air containing two liters of carbon monoxide per cubic meter. The animals were then transferred to normal air. This was done four times daily, five times per week. Blood carbon monoxide levels were very high but decreased rapidly when the animal was returned to normal air. Respiratory elimination of the gas was very active. Included are representative tables, and figures diagramming the experiments.

A64-81156
GLUTAMIC ACID–PYRUVIC ACID TRANSAMINASE AND GLUTAMIC ACID–OXALACETIC ACID TRANSAMINASE UNDER THE INFLUENCE OF CHLORPROMAZINE, RESERPINE, SEROTONIN AND PHYSICAL STRESS [GLUTAMINSAURE–BRENZTRAUBENSAURE– UND GLUTAMINSAURE–OXALESSIGSAURE–TRANSAMINASE UNTER DEM EINFLUSS VON CHLORPROMAZIN, RESERPIN, SEROTONIN UND KORPERLICHER BELASTUNG].
T. Kusch (Friedrich-Schiller-U., Inst. für Pharmakol., Jena, Germany).
Acta biologica et medica germanica, vol. 11, 1963, p. 485–493.
31 refs. In German.

The influence of chlorpromazine, reserpine, and serotonin (5-hydroxyteyptamine) upon the activity of glutamic acid-pyruvic acid transaminase as well as of glutamic acid–oxal acetic acid transaminase (GPT, GOT) was examined in the serum and organs of rats. The compounds tested do not effect any change in the activity of GPT in serum and liver, whereas a marked rise in the activity of GOT both in liver and serum is observed and statistically demonstrated after the application of chlorpromazine. The rise of GOT in the liver depends on the adrenal function and probably manifests an enzymatic induction. Serum (SGOT) however, also rises significantly after adrenalextomy and simultaneous application of chlorpromazine. Obviously, serotonin exerts a regulatory function on the GOT-activity. As compared to chlorpromazine, reserpine behaves differently and does not cause any SGOT-hyperfermentaemia. Probably the serotonin released by chlorpromazine and reserpine is subjected to different metabolic pathways in the organism. Moreover, chlorpromazine effects a weight reduction of the thymus gland. After physical stress (swimming) the expected rise in the SGOT-activity could not be proved. A release of the transaminases from the erythrocytes could not be observed either.

A64-81157
RADIATION PROTECTION EFFECT OF NEW PSYCHOTROPIC DRUGS [DIE STRAHLENSCHUTZWIRKUNG NEUERER PSYCHOTROPER PHARMAKA].
A. Locker and H. Ellegast (Osterreichische Studiengesellschaft für Atomenergie GmbH; and Wien U., I. Med. Klin., Austria).
Experientia, vol. 20, 1964, p. 389. In German.

Three psychotropic drugs, namely Valium (7-chlor-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-on), Tryptizol (5-(3-dimethylaminopropyliden)-dibenzo-(a,d) (1,4)-cycloheptadien-hydrochloride), and Insidon (4-(3-(5H-Dibenzo(b,f)-azepin-5-yl)-propyl-1-(2-hydroxyethyl)-piperazin-dihydrochloride) protect mice against lethal irradiation when administered 15 minutes before the latter. Survival increases significantly from 0% in the control series to about 30% in the pretreated series. With Taractan (α-2-Chlor-9-(3-dimethylamino-propyliden)-thioxanthen) when the animals are irradiated at the time of maximum depression of whole-body metabolism (i.e., 90 minutes after injection), the survival rate further increases from 42% to 73% and becomes highly significant.

A64-81158
PATHOGENESIS OF HIGH-ALTITUDE EMPHYSEMA.
P. N. Ivanov.
(Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia, vol. 7, 1963, p. 15.).
Federation Proceedings, vol. 23, Mar.–Apr. 1964, (Translation Supplement), p. T417–T419. 14 refs.
Translation.

When the atmospheric pressure drops to 56-3 mm Hg, the first sign of high-altitude emphysema in animals without oxygen supply or external compensation is pneumotemia in the cavities of the heart, followed by pneumoperitoneum and pneumothorax, and subsequently by subcutaneous emphysema. Signs of the formation of a gaseous medium in the cavities of the heart normally develop in the first second of a pressure drop to 3 mm. They appear at later periods even in animals breathing oxygen under pressure (without pressure clothing). Individual differences in the origin, course and intensity of gas and vapor formation are eliminated when barometric pressure falls below 8.5 mm. These differences are manifested to a greater extent in the development of high-altitude subcutaneous emphysema when barometric pressure is above this level. Nine seconds at a barometric pressure of 3mm Hg and subsequent increase in pressure according to the free-fall curve lead to the development of gas and vapor formation in organs and tissues continuing until the pressure has increased to 52-66 mm. Subcutaneous emphysema was not observed in all experimental animals. The inspiratory state of the thoracic cavity following decompression is retained in experimental animals until the development at low barometric pressure of the second phase– increase in the abdominal cavity– brought about by the development of high-altitude pneumoperitoneum. Injury in which the surface of the skin is broken immediately before decompression intensifies the development of high-altitude subcutaneous emphysema.

A64-81159
THREE THEORETICAL VIEWS OF SLANT PERCEPTION.
Howard R. Flock (Hunter Coll. of the City U. of New York).
Psychological Bulletin, vol. 62, Aug. 1964, p. 110-121. 44 refs.

Three current theories of slant perception are described. It is shown that the Gestaltist and Helmholtzian theories of slant perception depend on the shape-slant invariant and concomitantly on the familiarity of the presented shapes composing the surface (Helmholtzian) or on the goodness of the presented shapes (Gestaltist). In contrast, the Gibsonian theory of slant perception depends on complex angular relations (optical texture gradients) in the optical texture (array of patterned light to the eye) without regard to the familiarity or goodness of the textural shapes composing the distal surface.

A64-81160
TUBERCULOSIS IN MILITARY PERSONNEL OF THE AIR FORCE, FROM A POINT OF VIEW OF FORENSIC MEDICAL PRACTICES, AS DEFINED BY THE MEDICAL COMMISSION OF THE AIR FORCE'S FORENSIC MEDICAL INSTITUTE AT ROME IN THE DECADE 1954-1963 [LA TUBERCOLOSI NEL PERSONALE MILITARE DELL' A. M. SULLA SCORTA DELLE PRATICHE MEDICO-LEGALI DEFINITE DALLA COMMISSIONE MEDICA DELL'ISTITUTO MEDICO-LEGALE A. M. DI ROMA NEL DECENNIO 1954-1963].
E. Angeloni (Ist. Med.-Legale A. M. "Aldo di Loreto", Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 27, Apr.-Jun. 1964, p. 198-214. In Italian.

A study of morbidity statistics from the Air Force Medico-Legal Institute of Rome between 1954 and 1963 reveals that tuberculosis (especially pulmonary tuberculosis) ranks highest in comparison to other diseases. The following four categories of Air Force personnel were evaluated: pilots; specialists obligated to fly (mechanics, radiomen, etc.); military class; and others with or without obligation to fly. Tuberculosis causing temporary or permanent inability showed the highest incidence among the military class, and the lowest incidence in pilots. The low incidence of tuberculosis in pilots is attributed to accurate psychophysical selection techniques, and continuous periodic medical control measures. The medico-legal aspects of tuberculosis within the four categories are discussed.

A64-81161
STUDY ON PRESSURE CHANGES OF LABYRINTHINE FLUIDS [ETUDE DES VARIATIONS DE PRESSION DES LIQUIDES LABYRINTHIQUES].
M. Aubry, P. Piloux, and M. Burgeat.
Acta Oto-Laryngologica, vol. 57, 1964, p. 299-305.

A technique to record the pressure of labyrinthine fluids is described. The ears of anesthetized immobilized rodents (Meriones crassus) were opened and the labyrinthine pressure from the utriculus and semicircular canals was electronically monitored during several types of stimulation: from variations of the ambient air pressure (+ 12 to -12 mm Hg) and from very loud pure tones (up to 156 decibels). The resulting variations in labyrinthine pressure were probably from an initial physical reaction and a second biological reaction, which is latent, progressive, variable, and disappears slowly after the animal's death.

A64-81162
OBSERVING A SATELLITE FROM ANOTHER SATELLITE.
Ingeborg Schmidt (Ind. U., Div. of Optometry, Bloomington).
Optical Journal and Review of Optometry, vol. 101, Sep. 15, 1964, p. 33-36, 41-42. 9 refs.

With an increasing number of orbiting satellites, and in view of future rendezvous maneuvers in space, the problems of visibility and location of a space vehicle from another space vehicle deserves special attention. Psychological stress undergone during space missions may have some effects on visual acuity. However, weightlessness, noise, or vibration do not seem to be disturbing factors. Other physical effects create certain problems. The intervening transparent materials of the cabin window and of the face mask introduce a loss of light energy and distortion of the image. The motion of the observer and the target causes a lag in visual perception. Various luminance ranges require interfixational movements, which may introduce an error in the true location of the target. The haziness factor, which is so important in a low flying craft, will be eliminated in space missions because of the absence of atmosphere.

A64-81163
SOME SPIROMETRIC VALUES IN SUBJECTS OF THE MALE SEX AND BETWEEN 15 AND 18 YEARS OF AGE [COMPORTAMENTO DI ALCUNI VALORI SPIROMETRICI IN SOGGETTI DI SESSO MASCHILE E DI ETA COMPRESA FRA I 15 ED 18 ANNI].
Gian Carlo Cenacchi (Ist. di Med. Ind., Ravenna, Italy).
Rassegna di Medicina Industriale e di Igiene del Lavoro, vol. 33, Jan.-Apr. 1964, p. 137-140. 5 refs. In Italian.

Vital capacity, maximum expiratory volume per second, and Tiffenau's index were measured spirometrically in 200 males between 15 and 18 years of age while at rest. Regarding theoretical values, vital capacity in the majority of cases decreased by 10% to 30%, the greatest decrease appearing in the younger subjects. Tiffenau's index exhibited a higher value than generally considered normal for adult subjects. Maximum expiratory volume per second averaged 3250 cc., with a maximum of 4550 cc. and a minimum of 1900 cc. The respiratory apparatus of 15 to 18-year-old subjects presents different functional characteristics from those of adults, as based on anthropometry. The volume of air mobilized by an adult of medium height because of the disproportion still existing in the 15 to 18-year-old between statural increase and thoracic cage development. The air mobilized in the first expiratory second, with respect to total quantity of air mobilized throughout expiration, is proportionally greater than in the adult, probably due to the greater elasticity of the thoraco-pulmonary system in the young body.

A64-81164
COMPUTERS AND PERCEPTION.
Herman H. Goldstine.
Proceedings of the American Philosophical Society, vol. 108, Aug. 27, 1964, p. 282-290. 9 refs.

The relationship between the general-purpose computer and human perceptive powers are at best badly understood. Investigation of the problem is in its beginnings and may not advance for a long time. Many workers in the field are presently trying to explore what is known as artificial or machine reasoning or intelligence. In effect, they are trying to see how far a computer can go in doing tasks that we normally class as human ones. It is characteristic of all these efforts that the investigators have been unable to deduce any general principles from the results.

A64-81166
LOUDNESS FUNCTION OF A 1000-CPS TONE IN THE PRESENCE OF A MASKING NOISE.
Rhona P. Hellman and J. Zwislocki (Syracuse U., Lab. of Sensory Commun., N.Y.)
Journal of the Acoustical Society of America, vol. 36, Sep. 1964, p. 1618-1627. 28 refs.
ONR and NIH supported research.

Loudness levels of a partially masked 1000-c.p.s. tone are determined by loudness balance procedures and indirectly, by methods of magnitude estimation and production. It is shown that loudness balances obtained by the method of adjustment are consistent with the loudness judgments obtained by the combined method of magnitude estimation and production, called method of numerical magnitude balance. The final results are in good agreement with those of other investigations in which balanced procedures were followed.

A64-81173
SOURCES OF VARIATION IN REPEATED MEASUREMENT OF PLASMA FREE FATTY ACIDS IN RESTED FASTING SUBJECTS.
Leo E. Hollister (V. A. Hosp., Palo Alto, Calif.) and John E. Overall (Tex. U., Med. Branch, Res. Computational Center, Galveston).
American Journal of Clinical Nutrition, vol. 15, Sep. 1964, p. 149-157. 10 refs.
Grant No. NIH-G-MH-05144.

Plasma free fatty acids (FFA) were measured repetitively in different samples of rested, fasting subjects during six separate clinical studies. Statistical analysis of the sources of variance in these repeated measurements of FFA revealed the greatest contribution to be from intraindividual variation. Mean variance from this source averaged 62.5% for the series of six studies, ranging between 39.7% and 75.9% in individual studies. The remainder of the variance was attributable to differences between subjects; variance due to technical error was minimal. Mean coefficients of variation ranged between 18.6% and 29.3%, the usual trend being toward a reduction in variation with a decreased interval between measurements. Nonetheless, variation was high even when samples were taken at an interval of 1 hour (18.6%) or under identical basal conditions 24 hours apart (23.9%). This high degree of intraindividual variation of FFA levels must be considered in clinical studies using this measure, as many of the factors that affect FFA levels are beyond ordinary experimental control.

A64-81174
SOME EXPERIMENTS ON THE DISINTEGRATION OF YEAST BY HIGH INTENSITY ULTRASOUND.
E. A. Neppiras and D. E. Hughes (Oxford U., Dept. of Biochem., England).

Biotechnology and Bioengineering, vol. 6, Sep. 1964, p. 247-270. 17 refs. Rockefeller Found. and NIH supported research.

The effects of ambient pressure and ultrasonic power on the disintegration of yeast suspension were investigated. The results obtained are, in the main, consistent with the theory that cell breakage is primarily a phenomenon dependent on producing gaseous cavitation in the medium. The importance of the experimental results and techniques applied to commercial cell disintegrators is briefly discussed. A simple flow system is described that is easily attached to probe-type disintegrators. The use of a crystal pickup for tuning and control purposes is described.

A64-81175
STIMULUS CONTROL FOR BIRD ORIENTATION.
Merle E. Meyer (Wash. U., Seattle).
Psychological Bulletin, vol. 62, Sep. 1964, p. 165-179. 92 refs.

There are four experimental lines of approach to the understanding of stimulus control of bird orientation and navigation: (1) sun-compass orientation; (2) star-navigation; (3) sun-navigation; and (4) nonvisual guidance. Each approach has yielded important evidence that has, in turn, led to a sharper definition of problems and a more rigorous appraisal of each theory.

A64-81176
A PHYSIOLOGICAL EFFECT OF COGNITIVE DISSONANCE UNDER STRESS AND DEPRIVATION.
Mary L. Brehm, Kurt W. Back, and Morton D. Bogdonoff (Duke U., Durham, N.C.)
Journal of Abnormal and Social Psychology, vol. 69, Sep. 1964, p. 303-310. 9 refs.
Life Insurance Med. Res. Fund, Duke U. Center for the Study of Aging, and Irwin Strasburger Mem. Fund supported research.
Contract No. Nonr-1181-11 and Grant No. NIH-G-M-5356.

An experiment and a partial replication were conducted to relate the change of motivation due to dissonance reduction and commitment to physiological changes. The experimental technique was based on food deprivation studies by Brehm which showed that already deprived individuals who committed themselves to further fasting under conditons of low reward decreased their self-estimate of hunger, while the reverse was true for those given high rewards. The data suggest that a person who has convinced himself that he is not so hungry tends to respond physiologically as if he were not hungry.

A64-81177
PENTABORANE: RELATIONSHIP BETWEEN INHALED LETHAL AND INCAPACITATING DOSAGES IN ANIMALS.
Maurice H. Weeks, David G. Burke, Emery E. Bassett, Joseph R. Johnson, and Milton K. Christensen (U.S. Army Chem. Res. and Develop. Labs., Edgewood Arsenal, Md.)
Journal of Pharmacology and Experimental Therapeutics, vol. 145, Sep. 1964, p. 382-385. 7 refs.

The lethal concentrations (LC50) of pentaborane were determined for mice at 0.5-, 2-, 5- and 15-minute exposure periods, for dogs at 2-, 5-, and 15-minute exposure periods, and for monkeys at 2-minute exposure periods. All deaths occurred within 24 hours, although the observation period was to have been 7 days. Additional exposures of dogs and monkeys to concentrations approximating one-half, one-fourth, and one-eighth of their respective LC50's at each exposure time listed above were conducted. Dogs were observed for toxic signs and for variation in a conditioned avoidance response (CAR) test. Monkeys were observed for toxic signs and for changes in blood components (erythrocytes, packed red blood cell volume, hemoglobin, total and differential leukocyte count) and bromsulphalein (BSP) retention. Histopathologic studies were made on monkeys sacrificed 1, 2, and 4 weeks after exposure. All animals showed severe signs of intoxication after exposure to one-half of their LC50's, but minimal or no signs were noted after exposures to one-fourth and one-eighth of their LC50's. CAR effects occurred only after 1/2-LC50 exposures. No notable changes in the blood cell components or in BSP retention were seen. No gross or microscopic lesions were seen that could be considered compound-induced.

A64-81178
ROLE OF TEST TONE IN PRODUCING TEMPORARY THRESHOLD SHIFT.
M. Rodda (Canterbury U., Dept. of Psychol., Christchurch, New Zealand).
Archives of Otolaryngology, vol. 80, Aug. 1964, p. 160-166. 11 refs.

Experiments are reported in this paper in which the variation of temporary threshold shift (TTS) with a pure-tone test sound was studied under a variety of stimulus conditions. With a three-minute postexposure threshold determination, it was confirmed that maximal TTS occurs at a test frequency half an octave above the stimulus frequency. However, TTS in the first minute of the postexposure period was maximal at a test frequency equal to the stimulus frequency. TTS in the third minute of the postexposure period was maximal at a test frequency an octave above the stimulus frequency, with stimulus tones of less than 3,000 c.p.s. The results of the study confirm the existence of a dual TTS mechanism.

A64-81179
ELECTROENCEPHALOGRAPHIC WAVES WITH VOLUNTARY MOVEMENT.
C. H. Vanderwolf and W. Heron (McMaster U., Dept. of Psychol., Hamilton, Ontario, Canada).
Archives of Neurology, vol. 11, Oct. 1964, p. 379-384. 6 refs.
Canadian Natl. Res. Council, Defence Res. Board, and Natl. Res. Council Fellowship supported research.
Grants No. PHS-G-MH-05574-02; PHS-G-M-2455; and PHS-G-MH-03372-04.

Recent behavioral studies suggest that the thalamus plays a role in the higher level control of voluntary movement. Rats with large lesions of the medial thalamic nuclei were found to perform poorly on a simple avoidance task requiring active movement. Control experiments indicated that the defect was not due to motor disability (in the sense of paralysis), lack of fear, or inability to learn the task. If the animals were given sufficient time, they would often respond, but only after considerable delay. It was suggested that some structure in the medial thalamus forms part of a neural system that enables ideational processes to activate the motor system when a voluntary movement is made. If this is so, one might expect some sort of electroencephalographic change to occur in the medial thalamus of normal animals immediately preceding a voluntary movement. This report describes a first attempt to demonstrate such a change.

A64-81180
MAN AND TECHNOLOGY [CHELOVEK I TEKHNIKA].
B. F. Lomov (Leningrad U., USSR).
Leningrad, Izdatel'stvo Leningradskogo Universiteta, 1963, 266 p. 317 refs. In Russian.

Engineering psychology is a new science which combines the study of man and of the technical sciences. Comparative studies of man and machine permits an appraisal of man's accuracy and reliability in performing a given task based on time factors. Reception and transformation of information has three aspects: (1) relationship of stimulus and brain center functions; (2) quantitative evaluation of information received and transmitted, i.e., man's channel capacity; and (3) physiological aspects of mental processes in receiving and transforming information, i.e., subjective reflection of objective reality involving perception, representation, decision, and mental regulation of action for the practical task of signal choice. Two kinds of signals can be utilized: pictures and symbols. A picture reproduces certain properties of an object. Symbols constitute a code. Signals applied to psychological engineering research may be: (1) pointer scale instruments; (2) sign screens; (3) cathode ray tube screens (CRT); (4) graphs; (5) color codes; and (6) verbal instructions. There are still numerous problems left, the solution of which would permit improved human performance in accomplishing mechanical tasks.

A64-81181
OXYGEN POISONING WITHOUT HYPOVENTILATION.
Frank D. Gray, Jr. (Yale U. School of Med., Dept. of Internal Med.; and Grace-New Haven Community Hosp., New Haven, Conn.)
Diseases of the Chest, vol. 46, Sep. 1964, p. 360-363. 13 refs.

A case history is presented of man suffering from true oxygen poisoning after almost continuous use of oxygen therapy over a period of time. A discussion is given of the nature of true oxygen poisoning and oxygen induced carbon dioxide narcosis including pathological and physiological characteristics. Symptoms and diagnosis of the diseases are given and methods of treatment are discussed.

A64-81182
TRAIT JUDGMENTS OF MILITARY PILOTS FROM PHOTOGRAPHS.
D. J. Baer (Boston Coll., Dept. of Psychol., Chestnut Hill, Mass.)
Journal of Psychology, vol. 58, Oct. 1964, p. 357-360. 7 refs.

Ten photographs of military pilots were ranked by 30 subjects for three behavior traits: "best pilot," "best leader," and "most aggressive." The significant consistencies found in the rankings of the subjects for each behavior trait show that a stereotyped image existed for the three behavior traits. Significant correlations were found between the ranked physical traits and the ascribed behavioral traits of the pilots: older, taller, and heavier pilots were ranked as the "better pilots" and as the "better leaders."

A64-81183
SET AND SHOCK-STRESS EFFECTS UPON ILLUSION PERCEPTION.
Daniel J. Baer (Boston Coll., Dept. of Psychol., Chestnut Hill, Mass.)
Journal of Psychology, vol. 58, Oct. 1964, p. 467-472. 12 refs.

The effects of mental set and electric-shock stress were evaluated for three levels of shock (none, mild, and strong) with three perceptual sets (facilitating illusion perception, neutral, and inhibiting illusion perception) for four visual illusions (Necker cube, autokinetic effect, spiral aftereffect, and phi phenomenon). Significant set effects were found for the Necker cube, spiral aftereffect, and autokinetic phenomenon; and significant shock effect was observed for the autokinetic phenomenon. Perceptual performance for these illusions was maximal for strong shock and facilitating perceptual set, while it was minimal for strong shock and inhibiting perceptual set. Other set-shock conditions resulted in perceptual performance intermediate between these extreme conditions.

A64-81184
DETERMINATION OF BODY VOLUME BY HELIUM DILUTION: WITH SPECIAL REFERENCE TO THE INFLUENCE OF GASES, HEAT, AND MOISTURE EMITTED BY TRANSPIRATION AND RESPIRATION.
B. Stern (Karolinska Sjukhuset, Dept. of Clin. Physiol., Stockholm, Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 15, 1963, p. 339-352. Swedish Natl. Assoc. against Heart and Chest Diseases and Karolinska Inst. supported research.

A modification of Siri's method of body volume determination by helium dilution was developed. The principal advantage of the new system is that unreliable temperature measurements are eliminated through thermostatic regulation. The body volume can then be determined directly from a calibration curve without the need for temperature readings.

A64-81185
KINETICS OF BIOLOGIC SENESCENCE IN SPACE.
N. O. Calloway (V.A. Hosp., Med. Serv., Tomah, Wis.)
Journal of the American Geriatrics Society, vol. 12, Oct. 1964, p.923-925.

A discussion is presented of the rate of senescence of biological systems when exposed to high velocity in space. A mathematical analysis shows that no change in the rate of senescence or chemical reactions will occur until the speed of light is reached. There will be no gradual change with increasing velocity, and the rate of aging will not be accelerated if all external conditions are kept the same. When the velocity of light is reached, the limiting value may reach 0, and the processes in the cell would stop. This could lead to a state of suspended animation until the system has slowed down.

A64-81186
RELATION OF SLEEP-WAKEFULNESS RHYTHM TO NORADRENALIN AND SEROTONIN CONTENT IN THE CENTRAL NERVOUS SYSTEM OF HAMSTERS [BEZIEHUNGEN DES SCHLAF- UND WACHRHYTHMUS ZUM NORADRENALIN- UND SEROTONINGEHALT IM ZENTRALNERVENSYSTEM VON HAMSTERN].
N. Matussek and U. Patschke (Max-Planck-Inst., Deutsche Forschungsanstalt für Psychiatrie, Munich, Germany).
Medicina Experimentalis, vol. 11, 1964, p. 81-87. 10 refs. In German.

Estimations of daily changes of serotonin (5-hydroxytryptamine) and noradrenaline contents of the central nervous system of male hamsters were made at different times from 9 a.m. to 11 p.m. During sleep a higher serotonin level and a smaller decrease in the amount of noradrenaline was found as compared with the 7 p.m. value. The lowest serotonin level was at the time of the highest spontaneous motor activity, about 7 p.m. When the hamsters were awake and had slight motor activity, between 9 and 11 p.m., both amines were at a high level in equilibrium. The results are discussed in relation to the ergotropic and trophotropic systems and sleep-wakefulness cycle. It is suggested that normal sleep commences whenever the noradrenaline level falls below a certain level in presence of high serotonin content (at the receptor).

A64-81187
ELECTRORETINOGRAM AND CORTICAL EVOKED POTENTIALS UNDER HYPOTHERMIA.
Lee R. Wolin, L. C. Massopust, Jr., and J. Meder (Cleveland Psychiat. Inst., Lab. of Neurophysiol., Ohio).
Archives of Ophthalmology, vol. 72, Oct. 1964, p. 521-524. 10 refs.
Grants No. NIH-G-M-05756 and NIH-G-NB-04393.

The effects of hypothermia on the electroretinogram (ERG) and evoked potentials of the visual cortex were studied in cats and guinea pigs. During body cooling, the amplitudes of the evoked potentials are decreased and the waveform of the ERG becomes less complex. The latencies of the evoked responses are increased greatly by reduced temperatures. At 24° C the ERG is no longer detectable, while the cortical potentials may be reduced to as little as half their normothermic amplitude. The process is reversed during rewarming. Amplitudes of the potentials increase, complex waveforms return, and latencies decrease. When the animals return to their precooling temperatures, the evoked potentials also return to precooling values of amplitude and latency.

A64-81188
HUMAN INFORMATION TRANSMISSION WITH SEQUENCES OF SOUND PULSES AT DIFFERENT RATES.
R. R. Riesz (Bell Telephone Labs. Inc., Murray Hill, N.J.)
Ergonomics, vol. 7, Jul. 1964, p. 249-255.

The ability of a human operator to insert information into a machine by the use of a binary key was studied. The function of the binary key was to generate sequences of regularly-occurring sound pulses as long as it was pressed. The study was divided into two component parts: (1) The ability of the human operator to count the number of pulses in sequence of regularly-occurring pulses of 1000 c.p.s. tone. (2) The ability of the human operator to use a binary key to generate desired sequences of regularly-occurring sound pulses. Both of these abilities were studied as a function of pulse repetition rate and the number of pulses in a sequence. From a comparison of the rates of information transmission using a binary key and using other means, it is concluded that the use of a binary key of the type described is a relatively inefficient way for the untrained human operator to insert information into a machine.

A64-81189
POSTVIEW AND PREVIEW IN TRACKING WITH COMPLEX AND SIMPLE INPUTS.
E. C. Poulton (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Gt. Brit.).
Ergonomics, vol. 7, Jul. 1964, p. 257-266. 10 refs. MRC supported research.

An input consisting of one or four sine waves was tracked by 12 Naval ratings. Their view behind and ahead was varied systematically in different trials. A postview was found to help only when the more complex input was tracked without preview, the condition in which prediction was most difficult. Preview had its greatest effect when it allowed the subject to see the next reversal before he had reached the previous one, so that he could aim directly at each reversal in turn. It reduced all sources of error, more so with the less predictable complex input than with the simple input. The complex input produced higher scores on most of the measures of error.

A64-81190
AGE, INFORMATION TRANSMISSION AND THE POSITIONAL RELATIONSHIP BETWEEN SIGNALS AND RESPONSES IN THE PERFORMANCE OF A CHOICE TASK.
S. Griew (Bristol U., Dept. of Psychol., Gt. Brit.).
Ergonomics, vol. 7, Jul. 1964, p. 267-277. 8 refs.

Four multiple-choice reaction time experiments are reported. In the first, stimulus-response (S-R) compatibility is maintained at a high level by requiring subjects to respond by making a movement indicated directly by the position of the signal. In the second, subjects are required to respond in the direction indicated by the position of the 'mirror image' of the signal, and hence S-R compatibility is reduced. Rates of information transmission are calculated from the slope constants of the regression equations fitted to data on mean reaction times. While all subjects show a lower rate of information transmission in the second task than in the first, the reduction in the case of older subjects is not proportionally different from that shown by younger subjects. The third experiment tests predictions about the mean reaction times of subjects in tasks involving incompatible S-R relationships that are limited to certain subarrays of signals: the prediction is that mean reaction time will be proportional to $(\log_2 N) + (\log_2 N')$, where N= the total number of signals in the array, and N' = the number of signals in the subarrays within which incompatibility occurs. Of four specific predictions which are made, three are confirmed. The fourth experiment investigates individual differences by repeating the third experiment on a sample of subjects drawn from a population radically different from that employed in the third experiment. In this case only two predictions out of four are confirmed, and all observed mean reaction times seem to be proportional to $(\log_2 N) + (\log_2 2)$.

A64-81191
VISUAL AND AUDITORY VIGILANCE DURING EXPOSURE TO HOT AND HUMID CONDITIONS.
C. R. Bell, (London School of Hyg. and Trop. Med.; Med. Res. Council Environ. Physiol. Res. Unit, England). K. A. Provins (Adelaide U., Dept.

of Psychol., South Australia), and R. W. Hiorns
Ergonomics vol. 7, Jul. 1964, p. 279–288. 12 refs.

The effect of exposure to climatic conditions ranging in severity from 29.5/24.5° C to 63/47° C on the performance of (1) a visual and (2) an auditory vigilance task was studied separately in two series of experiments on fit young men. Exposure time decreased with increasing climatic severity. When performance was examined in terms of the proportion of signals missed to signals given, there was no evidence of a change in vigilance with different climatic conditions; but in both experimental series, a greater proportion of signals was missed as body (oral) temperature increased.

A64-81192
GUIDANCE, RESTRICTION AND KNOWLEDGE OF RESULTS.
D. H. Holding and A. W. Macrae (Leeds U., Dept. of Psychol., England).
Ergonomics, vol. 7, Jul. 1964, p. 289–295. 24 refs.

The effects of five kinds of training were compared with the performance of a control group in a manual positioning task. The training conditions were two schedules of mechanical guidance, a form of restrictive guidance, and two levels of knowledge of results. Performance deteriorated after the removal of detailed knowledge of results. All forms of training appeared to improve accuracy, the restriction condition being at least as effective as knowledge of results.

A64-81193
CHAIR ANGLES, DURATION OF SITTING, AND COMFORT RATINGS.
D. M. Barkla (Furniture Ind. Res. Assoc., London, Gt. Brit.).
Ergonomics, vol. 7, Jul. 1964, p. 297–304. 7 refs.

Ratings made on a simple scale, after 30-minute exposure to chairs, can discriminate reliably between assessments of different settings of the experimental chair used in this study, in terms of the satisfactoriness of the settings for the specific purpose of reading. From the results of the experiment it is not clear whether such a scale can be used to assess a particular setting absolutely. Ratings made on the same scale after 5-minute exposure to settings of the chair are substantially less sensitive and less stable, and their central tendency differs from that of ratings made after 30-minute exposures. A series of 5-minute exposures and ratings does not improve the consistency of subsequent ratings made after 30-minute exposures.

A64-81194
ANTICIPATORY HEART RATE IN ROPE CLIMBING.
A. J. Kozar (Mich. U., Ann Arbor).
Ergonomics, vol. 7, Jul. 1964, p. 311–315. 12 refs.

Using a newly developed telemetry system, records of heart-rate reaction of human subjects prior to the rope climb were obtained. The data presented on humans represents support for research by Rushmer, who experimented with dogs in demonstrating the role of the motor cortex in controlling the heart beat and particularly its involvement prior to vigorous exercise. The data consists of telemetered heart rates of 10 gymnasts prior to, during, and following a rope climb for speed. The percentage of anticipatory heart rate increase over basal value of post-warm-up for the climb was approximately 25%. This amount of anticipatory heart rate for the 10 subjects unassociated with actual energy expenditure would permit support of Rushmer's theory.

A64-81195
LIFE WITHOUT WEIGHT.
John Hillaby.
New Scientist, vol. 22, May 21, 1964, p. 471–472.

A critical analysis is given of some of the medical and biological space flight data presented by the Russians at the COSPAR meetings in Florence in May, 1964. Information on the effects of weightlessness on the cardiovascular system indicate that the Russian astronauts were having serious problems with hypotension and elasticity of muscular and elastic vessels. Effects of vibration, acceleration, and radiation were also reported. Studies done on the mold, Neurospora, and on the green plant, Tradescantia, indicated that weightlessness could be the cause of severe genetic aberrations.

A64-81196
RELATION OF THE NARROWING OF THE VISUAL FIELD WITH AN INCREASE IN DISTANCE TO MANIFEST ANXIETY.
Harald-Edwin Schmidt (Duquesne U., Pittsburgh, Pa.)
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 334–336. 8 refs.

The narrowing of the visual field with an increase in distance between subject and fixation point was investigated with 20 subjects under stable background conditions. Stimuli were introduced from the periphery, and readings were taken at the limits of sharp perception of figure. The observations of Aubert and Foerster were used as a starting point and subjects were equally divided into high- and low-anxiety groups on the basis of Taylor's Manifest Anxiety scale. The research demonstrated the narrowing of the visual field with an increase in distance, but the visual angle was greater for the high-anxiety group.

A64-81197
SPATIAL AFTEREFFECTS WITHIN AND BETWEEN KINESTHESIS AND VISION.
R. H. Day and G. Singer (Sydney U., New South Wales, Australia).
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 337–343. 9 refs.

Four experiments designed to investigate the claim that intermodal spatial aftereffects occur between kinesthesis and vision are described. The task required subjects to make judgments of either the kinesthetic or visual horizontal following protracted stimulation by slanted (15°) stimulus objects in the visual or kinesthetic modalities. Whereas the stimulus conditions used in Experiments I and II resulted in consistent and significant aftereffects within the 2 modalities, no intermodal kinesthetic or visual effects occurred. With appropriate controls, Experiments III and IV were designed to approximate as closely as possible conditions under which intermodal effects had been reported to occur in earlier experiments. In these experiments no such effect was found. The data from all four experiments show unequivocally that, for the judgmental task used, there is no evidence for the occurrence of intermodal spatial aftereffects.

A64-81198
INTERACTIVE EFFECTS WITHIN VISUAL PATTERNS ON THE DISCRIMINABILITY OF INDIVIDUAL ELEMENTS.
E. Rae Harcum (Coll. of William and Mary, Williamsburg, Va.)
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 351–356. 13 refs.
Grant No. PHS-G-NB-02661-03.

The problem is whether perceptual accuracy for individual elements of a tachistoscopic pattern is determined by relative position within the pattern, or by absolute position on the retina. Binary patterns of 17, 9, or 5 open and blackened zeros were exposed horizontally across fixation to 4 observers, who attempted to reproduce the pattern. Spacing of targets was varied so that it was possible to compare performance at the same retinal position within targets having different numbers of elements, and also at different retinal positions for elements at the same ordinal position within targets having the same number of elements. For each observer errors were fundamentally predictable from relative position within a pattern of a given length. Therefore, accuracy was determined by interaction among elements, and mnemonic organization, rather than by retinal sensitivity.

A64-81199
EFFECTS OF CODING STRATEGY ON PERCEPTUAL MEMORY.
Ralph Norman Haber (Yale U., New Haven, Conn.)
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 357–362. 14 refs.
Grant No. PHS-G-MH-03244.

Thirty-seven subjects were taught 1 of 2 strategies to encode and rehearse orally briefly presented multidimensional stimuli. Analyses were directed at separating the effects on accuracy of encoding processes and of retention processes. The 2 strategies of encoding differed on the speed of encoding and on the accuracy of encoding. Further, stimuli encoded slowly were more likely to contain errors, independent of retention processes. The strategies of retention differed on several types of interference responses during rehearsal (retention), responses that produced errors during rehearsal, independent of errors made during encoding. These results supported hypotheses about speed of encoding and interferences during retention and showed how these effects could account for differences between the coding strategies.

A64-81200
TRANSFER IN PERCEPTUAL LEARNING FOLLOWING STIMULUS PREDIFFERENTIATION.
Henry C. Ellis and Douglas G. Muller (N. Mex. U., Albuquerque).
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 388–395. 11 refs.
Grant No. NSF-G-G-23427.

Two experiments on stimulus predifferentiation were conducted to test the acquired distinctiveness of cues and differentiation hypotheses of perceptual learning. In the first, 240 subjects were given a recognition test following stimulus predifferentiation training. Observation training yielded superior recognition of 6-point shapes and distinctiveness pretraining yielded superior recognition of 24-point shapes. The former result was consistent with the differentiation theory and the latter with acquired distinctiveness. In the second, 30 subjects received stimulus predifferentiation training followed by a discriminative transfer task. Distinctiveness pretraining yielded greater

positive transfer than observation, a result consistent with acquired distinctiveness of cues.

A64-81201
ADAPTATION OF THE GSR UNDER REPEATED APPLICATIONS OF A VISUAL STIMULUS.
H. D. Kimmel (Fla. U., Gainesville).
Journal of Experimental Psychology, vol. 68, Oct. 1964, p. 421-422.
Grant No. NIH-G-M-6060.

Three hundred college students received either 20 presentations of a visual stimulus or as many as were needed to reach an adaptation criterion of 2 successive trials of 0 response, whichever occurred first. Mean galvanic skin response magnitude (log conductance change) was found to decrease gradually, in negatively accelerated fashion, over trials, reaching an asymptotic value somewhere near 18 to 20 trials. Subjects who required all 20 trials adapted at a slower rate and never completely "adapted."

A64-81202
A POSSIBLE OPTICAL BASIS FOR MONOCULAR SLANT PERCEPTION.
Howard R. Flock (Hunter Coll. of the City U. of New York).
Psychological Review, vol. 71, Sep. 1964, p. 380-391. 10 refs.
Grant No. PHS-G-MH-06942-01.

Optic variables that correspond to various properties of distal substances and define the axial coordinates and the slant of a surface are isolated in the light to the eye. The textural elements composing a surface are assumed to be randomly irregular in shape, size, and separation; and to have certain light-reflecting properties; but no prior assumptions are made about the position and illumination of the surface. The accurate specification of distal surface slant from optic variables is demonstrated both when the head of the viewer and the surface are motionless and when the surface is moving. Testable hypotheses that are derived from the theoretical model are mentioned at various places. Presumptive abilities necessary to the registration of the optic variables are also described.

A64-81203
CONSISTENCY OF AUDITORY DETECTION JUDGMENTS.
David M. Green (Mass. Inst. of Technol., Res. Lab. of Electron. and Psychol. Section, Cambridge).
Psychological Review, vol. 71, Sep. 1964, p. 392-407. 15 refs.
AFOSR, ONR, and US Army supported research.
Contract No. AF 19(604)-7459 and Grant No. NSF-G-G-21807.

An observer's decision in a psychoacoustic detection experiment is governed by two broad classes of determinants: (a) external determinants, such as the likelihood of a particular waveform being a signal in noise and (b) internal determinants, such as the momentary state of the observer's nervous system, his response biases, or biases as to certain sequences of responses. An analysis of these determinants and especially their relation to a trial-by-trial prediction of the subject's response (a molecular psychophysics) was undertaken. The analysis suggests that the relative importance of the external and internal determinants can be assessed by measuring the consistency of the observer's responses to repeated presentations of the same auditory signals. An experimental technique is introduced to measure such consistency and the results of some experiments are summarized. The results indicate that the amount of external variability is about the same as the internal variability. The implication of this result for any attempt to predict trial-by-trial is discussed.

A64-81204
GALVANIC SKIN RESPONSE AFTER SLEEP DEPRIVATION.
Laverne C. Johnson (US Navy Med. Neuropsychiat. Res. Unit, San Diego, Calif.)
Psychological Reports, vol. 15, Oct. 1964, p. 549.
USN Bureau of Med. and Surgery Research Task MR 005.12-2304.
Grant No. NSF-G-GB-922.

Cortical activity (EEG), heart rate, skin temperature, respiration, vasomotor activity, and skin resistance were recorded during sleep from a 17-year-boy after 264 hours of wakefulness. With the onset of sleep all the autonomic variables except skin resistance showed an almost immediate reversion from an activated state to more normal levels. To determine the extent of this differing recovery rate for skin resistance, an examination of basal skin resistance and the galvanic skin response (GSR) was made for the three recovery nights and the three postrecovery nights of sleep obtained 1 week, 6 weeks, and 2 months after sleep onset. Examination of the responses for each autonomic variable over all nights indicated that a plethysmogram response was present to 83% of the 70 tone stimuli; a heart rate response to 56%; and a GSR was present after 43% of the stimuli (for GSR, stimuli during the first recovery night where no responses were seen is not included). These findings suggest a differential recovery rate among autonomic variables and a differential responsiveness to stimuli presented during sleep that is independent of the EEG stage of sleep.

A64-81205
LEADERSHIP AS PSYCHOPHYSIOLOGICAL ACTIVATION OF GROUP MEMBERS: A CASE EXPERIMENTAL STUDY.
S. A. Rudin (Dalhousie U., Halifax, Canada).
Psychological Reports, vol. 15, Oct. 1964, p. 577-578.

Two teams of five men each were studied under isolation conditions for 12 days in a spaceship mock-up. Measures were taken of their performance on a variety of perceptual, cognitive, and cooperative tasks; of their physiological status; and of their attitudes toward others. The results were interpreted as indicating that an aggressive, punishing leader pushed his followers to a higher level of physiological activation, leading to more efficiency on simple tasks but less on more complex ones, and to greater psychological stress among the crew.

A64-81206
SEARCHING FOR NOVEL TARGETS.
Ulric Neisser and Robert Lazar (Brandeis U., Waltham, Mass.)
Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 427-432. US Army, Navy, and Air Force supported research.
Grant No. NSF-G-G-21654.

Subjects can search for any unfamiliar symbol in a list of letters as rapidly as for any numeral, but less rapidly than for a fixed and familiar symbol. This suggests that novelty is not an immediately given property of stimuli, but one outcome of a particular kind of pattern processing.

A64-81207
OXYGEN CONSUMPTION AND CHANGES OF COLOUR IN THE HUMAN EPIDERMIS: THEIR MEASUREMENT IN VIVO WITH THE CYCLOPS OXIMETER.
G. H. Findlay (Pretoria U., Sect. of Dermatol., Union of South Africa).
South African Journal of Laboratory and Clinical Medicine, vol. 10, Sep. 19, 1964, p. 73-76. 14 refs.

The cyclops oximeter is a potentially excellent tool for analyzing certain dermatological data such as intermittent day-to-day color changes as well as continuous changes over short periods. Sundry problems of a technical and interpretative kind are bound to arise when the machine is used. An account is given of its application to the measurement and interpretation of direct pigmentation, the measurement of ultraviolet damage to skin respiration, the action of cocarcinogens, the pathogenesis of scleroderma in miners, and the effects of pure oxygen inhalation.

A64-81208
CHANGES IN VESTIBULAR FUNCTION INDUCED BY THE ADMINISTRATION OF LARGACTIL.
R. Scarzella, R. Hahn, and F. Fruttero (Turin U., Clin. of Nervous and Mental Diseases and Ear, Nose, Throat Clin., Italy).
Panminerva Medica, vol. 6, Sep. 1964, p. 310-313. 16 refs.

The administration of chlorpromazine to man, guinea pigs, rabbits, and cats brings about a quantitative change in the nystagmus induced by cold labyrinthine stimulation. This change consists in a marked predominance of the slow phase. On the basis of the findings obtained from the literature relating to studies similar to that reported in the present paper, the action of chlorpromfizine on vestibular afferent pathways and on the mechanism underlying nystagmus is discussed.

A64-81209
EFFECT OF CHLORPROMAZINE ON PERIPHERAL CIRCULATION AND ON THE OXYGEN CONSUMPTION OF THE EXTREMITIES MUSCLES.
F. Solti, M. Iskum, I. Krasznai, Gy. Mark, J. Rev, K. Földessy, and R. Hermann (Budapest U., First Dept. of Med., Hungary).
Cor et Vasa vol. 6, 1964, p. 130-137. 7 refs.

Repeated parenteral administration of chlorpromazine results in a striking phenomenon: after giving the injection, the skin (first of all of the extremities) becomes markedly red, and blood in the ante-cubital or lemoral veins is of a striking red color. These two phenomena permit us to surmise that the peripheral circulation may undergo severe changes due to the effect of chlorpromazine. Data on the effect of chlorpromazine and phenothiazine derivatives on the peripheral circulation are rather poor and contradictory, and we have studied the problem with larger material.

A64-81210
THE EFFECT OF ADRENALINE ON THE RELATIONSHIP BETWEEN OXYGEN NEED AND SUPPLY IN THE MYOCARDIUM.
V. Ganz (Inst. for Cardiovascular Res., Prague, Czechoslovakia).

Cor et Vasa, vol. 6, 1964, p. 142-146. 20 refs.

Systemic and coronary hemodynamics and oxygen metabolism of the heart were measured during 20 min. infusion of adrenaline in 15 dogs. Myocardial extraction of oxygen was used as a criterion of adequacy of oxygen supply to the heart rather than just the external workload. Myocardial extraction of oxygen decreased with adrenaline, while the lactic acid content of sinus blood increased. The rise in oxygen need in the myocardium following adrenaline perfusion can be sufficed by an adequate increase in coronary blood flow.

A64-81211

THE EFFECT OF CENTIMETER WAVES OF VARYING INTENSITY ON THE BLOOD AND HEMOPOIETIC ORGANS OF ALBINO RATS (VLIIANIE SANTIMETROVYKH VOLN RAZLICHNYKH INTENSIVNOSTEI NA KROV' I KROVOTVORNYE ORGANY BELYKH KRYS).

I. A. Kitsovskaia (USSR, Acad. of Med. Sci., Inst. of Labor, Hyg., and Profess. Diseases, Moscow).

Gigiena Truda i Professional'nye Zabolevaniia, vol. 8, 1964, p. 14-20. In Russian.

Albino rats were subjected to irradiation with 10-cm. waves of varying intensity in a study of their effect on the peripheral blood and the hematopoietic system. Waves of 40 and 100mw/cm.^{2} produced: (1) a drop in the erythrocyte count with no noticeable effect on the hemoglobin content; (2) an increase in the number of reticulocytes; and (3) a slight increase in the number of the segmented neutrophils. The 10 mw/cm.^{2} waves produced: (a) leucopenias, (b) an increase in the number of the segmented neutrophils, and (c) a decrease in the number of lymphocytes. The degree and the onset of these changes depended on the intensity and the duration of irradiation. The bone marrow showed an increase in the red marrow with a slight change in the white marrow and a decrease in the number of the segmented neutrophils. The damaging effect of radiation was not of a permanent nature, and recovery followed.

A64-81212

SENSORY DEPRIVATION: AROUSAL AND RAPID EYE MOVEMENT CORRELATES OF SOME EFFECTS.

Ascanio M. Rossi, Allan Furhman, and Philip Solomon (Harvard Med. School, Cambridge; and Boston City Hosp., Mass.)

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 447-451. 21 refs.

Grant No. Nonr-G-T. 66(29).

Three subjects in sensory deprivation were continuously monitored by electroencephalographic (EEG) and electrooculographic recordings. Retrospective reports of their mental states were given upon receipt of a signal. Ratings of report contents were compared with EEG determined levels of arousal and with the occurrence of rapid eye movements (REMs). Results indicate that the incidences of hallucinations and thought disorganization vary inversely with level of arousal, and hallucinations are not accompanied by REMs as occurs during dreaming.

A64-81213

STEREOGRAMS FROM AFTERIMAGES.

T. Bower, W. M. Goldsmith, and J. Hochberg (Cornell U., Ithaca, N.Y.)

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 510.

Grant No. NSF-G-GB-71.

A glass stereogram was transilluminated by a flash located 1 foot behind the stereoscope. Each half-view bore three slits, 1/32 inch wide and 3 inches tall, and a 1/32-inch luminous dot so placed next to the central slit in each half-view that, when the dots were fused, the combined view contained two outer lines (each viewed by both eyes), 16° apart. The center lines then formed a double image with 0.12° disparity. Reversing the half-views changed the disparity from "center near" to "center far". In Condition I, 10 naive subjects dark adapted to 5 minutes, adjusted the stereoscope in semidarkness, then fired the flash and reported immediately whether the centerline in the afterimage was near or far. There were 5 near and 5 far trails in randomized order, with an intertrial interval of 1 minute. Condition II differed only in that the afterimages were sustained by a flickering (4 c.p.s.) white field for 15 seconds after each flash, following which depth was judged. In Condition I (immediate response), subjects judged better than chance and better than in Condition II. It is concluded that eye-movement-produced changes are unnecessary to stereopsis, and that some other sign must identify which eye receives each half-view in the very first moment of binocular input.

A64-81214

SOME ATTRIBUTIVE CHARACTERISTICS OF BINOCULAR RIVALRY.

Gerald M. Meredith and Connie G. W. Meredith (Ill. U., Urbana).

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 511-514. 6 refs.

The purpose of the present study was to investigate the effect of two binocular visual fields upon the tendency to employ certain attributive terms. Sixty-two subjects described their subjective impression of a fused (Ganzfeld) and rivalry field along 30 bipolar rating dimensions, and 24 (80%) of the scales significantly differentiated the field ($p < .01$). Thus, reversibility experiences, such as binocular rivalry and figure reversal, may be understood in terms of Osgood's semantic framework.

A64-81215

TECHNIQUE FOR OCCLUDING VISION IN EITHER EYE WITHOUT SUBJECT'S AWARENESS.

Gerald V. Barrett (Goodyear Aerospace Corp., Akron, Ohio).

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 544-546.

A technique is described that allows either eye to be occluded without the subject's awareness. The apparatus consists of two eyepieces with a polaroid filter behind each and a projector with a polaroid filter in front of it. The filters were positioned so that rotation of the filter in front of the projector resulted in occluded vision for either eye. This technique can be applied when the effect of suggestion on performance of one eye versus two eyes needs to be controlled.

A64-81216

SIMPLE MOTOR PERFORMANCE UNDER POSITIVE AND NEGATIVE APPROVAL MOTIVATION.

Bonnie R. Strickland and Orvin Jenkins (Emory U., Atlanta, Ga.)

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 599-605. 22 refs.

Emory U. Res. Committee supported research.

Forty male college students (10 high need-for-approval and 10 low need-for-approval subjects after positive approval conditions, and 10 high need-for-approval and 10 low need-for-approval subjects after negative approval conditions) completed five 60-second trials on the pursuit rotor. High need-for-approval subjects, regardless of conditions, showed a significantly higher rate of performance than did low need-for-approval subjects. Low need-for-approval subjects showed some effect of positive and negative conditions but this difference did not reach significance. Indications for further research with regard to methodological problems of assessing performance, the stability of the need for approval and pursuit rotor performance relationship over extended practice, and the investigation of the relationship of need for approval and pursuit rotor performance of female subjects were suggested.

A64-81217

PROPERTIES OF SOUND AND THE AUDITORY-VISUAL DIFFERENCES IN TIME JUDGMENT.

Joyce Levis Goldfarb and Sanford Goldstone (Baylor U., Coll. of Med.; and Jewish Inst. for Med. Res., Houston, Tex.)

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 606.

Grant No. PHS-G-MH-01121.

Forty adult subjects made single stimulus judgments of the duration of white lights and sounds along either a 9-category scale of longness-shortness or in comparison with the subjective concept of one clock second. Analysis of data revealed a significant difference in time judgments due to the sensory modality confirming the auditory-visual difference; white sounds were judged longer than white lights.

A64-81218

RETENTION OF A SKILL AS A FUNCTION OF DISPLAY/HAND MOVEMENT RATIO DURING TRAINING.

J. J. Lavery (Defence Res. Labs., Toronto, Canada).

Perceptual and Motor Skills, vol. 19, Oct. 1964, p. 626.

An experiment with 36 subjects explored the effect of varying the amount of information contained in knowledge of results and of the cues inherent in a task on the retention of this task. A simple motor task was used that involved the displacement of a lever to move a bar toward the target on a display. The results suggest that retention can be influenced by precision of the knowledge of results if the degree of information in the task is great enough.

A64-81219

STUDY OF THE RELATIONSHIPS BETWEEN CARBON DIOXIDE AND NEUROGENIC RESPIRATORY STIMULI IN MUSCULAR EXERCISE IN MAN [ETUDE DES RELATIONS ENTRE STIMULUS VENTILATOIRE GAZ CARBONIQUE ET STIMULUS VENTILATOIRES NEUROGENIQUES DE L'EXERCICE MUSCULAIRE CHEZ L'HOMME].

R. Lefrançois and P. Dejours (Paris U., Fac. de Méd., Lab. de Physiol.; and Centre Marie-Lannelongue, Paris, France).

Revue Francaise d'Etudes Cliniques et Biologiques, vol. 9, 1964, p. 498-505. 36 refs. In French.

The ventilatory reactions of three subjects (two females, one male) at different levels of alveolar carbon dioxide partial pressure were studied during muscular exercise (active or passive leg movements). In the awake subject, considerable hypocapnia following a period of voluntary hyperventilation induced no apnea but only hypopnea. During hypopnea caused by hypocapnia, passive or active leg move-

ments produced an increase in ventilation. Ventilatory control by carbon dioxide was therefore not a necessary prerequisite for activation of the respiratory centers by neurogenic stimuli; these stimuli act autonomously. There was no instance in which carbon dioxide appeared to be indispensable to the effects of other respiratory stimuli. This observation may imply that carbon dioxide and neurogenic stimuli act independently. Independence and interaction of various respiratory stimuli are reviewed.

A64-81220
A MODEL OF ELECTROMAGNETIC ENVIRONMENT IN CISLUNAR SPACE.
W. A. Livingston and E. Hart (Cornell Aeron. Lab., Inc., Buffalo, N.Y.
IN: ADVANCES IN THE ASTRONAUTICAL SCIENCES, vol. 9; Proceedings of the Fourth Western Regional Meeting of the American Astronautical Society, San Francisco, Calif., Aug. 1-3, 1964.
Edited by Eric Burgess.
New York, American Astronautical Soc., 1963, p. 241-254.
Contract AF 33(616)-6858.

This paper presents the design concepts for a model of the electromagnetic environment in cislunar space for use with a flight training simulator. The model will constitute only a small portion of the simulator and hence, must be kept relatively simple. It must maintain accuracy of representation, operate in real time, and be capable of programming for rapid computations.

A64-81221
SOLAR CORPUSCULAR AND RADIO EMISSION.
D. H. Robey (Gen. Dyn./Astron., San Diego, Calif.)
IN: ADVANCES IN THE ASTRONAUTICAL SCIENCES, Vol. 9; Proceedings of the Fourth Western Regional Meeting of the American Astronautical Society, San Francisco, Calif., Aug. 1-3, 1961.
Edited by Eric Burgess.
New York, American Astronautical Soc., 1963, p. 268-318. 46 refs.

Some of the physical characteristics of the Sun that relate to the production of hazardous radiations are presented and discussed from the viewpoint of man in space. Phenomena that pertain to the possible prediction of intense solar flares are also discussed and a sample flare forecast was made. Daily maps of the sunspot magnetic fields are needed to do this properly. Other topics include solar X-rays, sunspot-flare relationships, the solar cycle, the solar wind, the interplanetary magnetic field, flare classification, Russian observations, beam widths of plasmas, and radio noise generation. It was deduced that the year 1968, which is expected to be the next peak in the solar cycle, will be relatively quiet compared to activity during the last 4 years. It was estimated that not more than one class 3+ or more than nine class 3 flares will occur in 1968.

A64-81222
THE EFFECTS OF OUTER-SPACE ENVIRONMENT ON THE SIMULATION OF SPACE VEHICLES.
Eugene Hart and William Livingston (Cornell Aeron. Lab., Inc., Buffalo, N.Y.)
IN: ADVANCES IN THE ASTRONAUTICAL SCIENCES, Vol. 9; Proceedings of the Fourth Western Regional Meeting of the American Astronautical Society, San Francisco, Calif., Aug. 1-3, 1961.
Edited by Eric Burgess.
New York, American Astronautical Soc., 1963, p. 319-335. 12 refs.
Contract AF 33(616)-6858.

The natural environment of space will affect manned space systems in many ways. Some of these effects will be detrimental to the performance of either the vehicle or its crew or both. Hence, during the training phase the crew must learn how to cope with, and, if possible, experience, the effect that may degrade his performance. This paper discusses the effects caused by the natural environment that may require simulation in a crew-training simulator. Effects due to induced environments, e.g., out-gassing from the vehicle, were neglected. The natural environment, its primary effects on the vehicle and its crew, the malfunctions that may occur, and the reliability and adequacy of the available data were considered before the conclusions presented were decided upon. The study was general and not confined to any particular vehicle or trajectory. Consequently, all the conclusions do not pertain to any one space mission, but must be modified depending on the vehicle's characteristics and its position in space.

A64-81223
LIFE SUPPORT PARAMETERS IN THE SPACE ENVIRONMENT.
H. H. Bovee, G. M. Christensen, Irena Zommers, and Joan M. Thompson (Boeing Co., Aerospace Div., Seattle, Wash.)
IN: ADVANCES IN THE ASTRONAUTICAL SCIENCES, Vol. 9; Proceedings of the Fourth Western Regional Meeting of the American Astronautical Society, San Francisco, Calif., Aug. 1-3, 1961.
Edited by Eric Burgess.
New York, American Astronautical Soc., 1963, p. 336-344.

In the hostile environment of space, man must carry his own life-support system. His minimum requirements include air, food, and water, and means for waste disposal. Relatively crude systems will suffice for early flights of short duration; but with longer missions and deeper penetration into space, the life-support systems become more complex. Boeing Company is maintaining a program of research in several specific life-supporting areas. Chemical air recycling systems are being investigated with emphasis on superoxide and hydrogenation methods. Photosynthetic algae and broadleaf plants are being studied in relation to both air and food regeneration. A urine recycling unit has been built in prototype form, and a complete waste processing and recovery system is under development.

A64-81224
FACTOR ANALYSES OF CARDIOVASCULAR TEST VARIABLES.
T. K. Cureton and L. F. Sterling (Ill. U., Phys. Fitness Res. Lab., Urbana).
Journal of Sports Medicine and Physical Fitness, vol. 4, Mar. 1964, p. 1-24. 49 refs.

A factor analysis was made of 104 cardiovascular test variables, administered to 100 young male subjects under well-standardized conditions. Test variables from the brachial pulse wave were determined from Cameron heartometer graphs by vernier planimeter measurement, the all-out treadmill run time, and also the correlative oxygen intake and oxygen debt data, and electrocardiographic measurements. The study shows that certain test may be grouped to measure some proportionate part of the following nine main components (or factors) which were factored out: (1) blood ejection velocity from the heart, (2) oxygen requirement, (3) pulse pressure after work, (4) body weight, (5) pulse recovery after easy work in terms of pulse ratio, (6) endurance in all-out treadmill run, (7) vagus tone, (8) splanchnic tone, and (9) aerobic capacity. The factors derived and tentatively described render sharper meaning to the several components (like variances) in the complex area of cardiovascular fitness. The latter area can be improved by testing the components which can be predicted with sufficiently high precision, thus focusing sharply upon certain factors and eliminating duplication.

A64-81225
PHYSICAL EFFORT AND ITS EFFECT IN REDUCING ALIMENTARY HYPERLIPAEMIA.
A. Cantone (Milan U., Dept. of Human Physiol., Italy).
Journal of Sports Medicine and Physical Fitness, vol. 4, Mar. 1964, p. 32-36. 6 refs.

Ten men, after fasting for 14 hours, were given a meal of 1000 calories either of low-fat content or high-fat content. After the meal, subjects either did not exercise, exercised immediately, or exercised 3 hours later. The high-fat content meal caused an increase in lipemia, while exercise immediately after a high-fat content meal reduced hyperlipemia and plasma lipoproteins. Lipid metabolism is increased by exercise, and this is shown by the increase in nonesterified fatty acids after exercise. The mechanism of this action on the metabolism of lipids is thought to be related to catecholamine release and enzyme action.

A64-81226
RELATION OF PREOPTIC TEMPERATURE TO THE FUNCTION OF THE SYMPATHICO-ADRENOMEDULLARY SYSTEM AND THE ADRENAL CORTEX.
B. Anderson, C. C. Gale, B. Horfelt, and A. Ohga (Veterinärhögskolan, Dept. of Physiol.; and Karolinska Sjukhuset, Dept. of Endocrinol., Stockholm, Sweden).
Acta Physiologica Scandinavica, vol. 61, 1964, p. 182-191. 22 refs.

During local cooling of the preoptic/anterior hypothalamic region (the heat loss center) at about 18° C external temperature, the urinary excretion of catecholamines was increased. At the same time marked core hyperthermia developed. The relative increase of adrenaline excretion was considerably greater than that of noradrenaline excretion (117% vs. 48%). Repetitive central cooling performed over longer periods of time caused signs of cold acclimation in spite of the fact that the animals were not exposed to a lowered external temperature. During local warming of the heat loss center in a cold environment (2° to 5° C), the urinary excretion of catecholamines remained low but increased considerably on cessation of central warming. Both adrenaline and noradrenaline excretion then rose to high levels if a more pronounced hypothermia had developed during central warming. With induction of a milder degree of hypothermia the increase was predominantly in noradrenaline excretion. Plasma cortisol determinations did not reveal any clear-cut relation between preoptic temperature and adrenocortical activity.

A64-81227
THE HYPERVENTILATION IN THE FIRST 15 SECONDS OF MUSCULAR WORK.
Giorgio Torelli and Giorgio Brandi (Milan U., Inst. of Human Physiol., Italy).
Journal of Sports Medicine and Physical Fitness, vol. 4, Mar. 1964, p. 25-27. 15 refs.

The initial hyperventilation from the 6th sec. to 15th sec. after the onset of physical exercise was studied in subjects walking on a 10% graded treadmill. This is a period of nervous stimulation before the reaction due to carbon dioxide takes place. In the period studied, ventilation appears to be a linear function of the mechanical work, but this function is variable. It is modified by stimuli of the mouthpiece or others. The linear relationship appears consistent with the theory that this part of hyperventilation is caused by afferent impulses from the muscular mechanoreceptors.

A64-81228
NOISE EXPOSURE AND HEARING IMPAIRMENT.
Walter Alexander (Manitoba U., Dept. of Otorhinolaryngol., Winnipeg, Canada).
Canadian Journal of Public Health, vol. 55, Jun. 1964, p. 237-242. 11 refs.

A discussion is presented on noise and its physical characteristics along with some of its biological effects. Nonauditory effects, such as interruption of communication, increased blood pressure, and loss of work efficiency are cited. These problems are related to modern civilization and occupations. Auditory effects, both permanent and temporary, are discussed in relation to sound levels, temporary threshold shift, and noise frequencies. Prevention of damage and protection from noise is stressed, and recommendations in these areas are given.

A64-81229
THE REPEATABILITY OF VENTILATORY RESPONSES TO EXCESS OF CARBON DIOXIDE AND LACK OF OXYGEN.
J. L. Anderton, E. A. Harris, and K. B. Slawson (Edinburgh U., Dept. of Therapy., Gt. Brit.).
Quarterly Journal of Experimental Physiology, vol. 49, Jan. 1964, p. 43-51. 8 refs. Med. Res. Council and Riker Res. Fellowship supported research.

The ventilatory responses to carbon dioxide (CO_2) without hypoxia, to hypoxia at constant alveolar tension (P_{ACO_2}) and to CO_2 combined with hypoxia were measured in duplicate with an interval of 20 min. between the two sets of measurements. The P_{ACO_2} threshold during the second set differed in only random fashion from that during the first set; so did the CO_2 sensitivity in the absence of hypoxia. The CO_2 sensitivity during hypoxia, however, was significantly greater during the second set of measurements. The relevance of these results to the investigation of drugs which affect respiration is discussed.

A64-81230
THE PERCEPTION OF RHYTHMICALLY REPEATED LINEAR MOTION IN THE VERTICAL PLANE.
E. G. Walsh (Edinburgh U., Dept. of Physiol., Gt. Brit.).
Quarterly Journal of Experimental Physiology, vol. 49, Jan. 1964, p 58-65. 6 refs.

Using a modified Roberval balance that could be set to oscillate at different frequencies observations have been made on the sensations aroused by vertical motion. Thresholds for oscillations of 1/3 c.p.s. and 1/9 c.p.s. have shown that the peak acceleration needed is higher at the lower frequency. The phase relationships of the sensations are out of step with the motion of the balance. The view is put forward that the sensory system is concerned to a significant degree in detecting jolts.

A64-81231
INFLUENCE OF HIGH ALTITUDE ON THE PULSE RATE AT WORK.
F. Mangili, P. Aghemo, and R. Margaria (Climatic Physiol. Station, St. Moritz-Bad, Switzerland; and Milan U., Physiol. Lab., Italy).
Helvetica Physiologica et Pharmacologica Acta, vol. 22, 1964, p. 66-69. 10 refs.

The correlation between heart rate and oxygen consumption has been studied on 5 young subjects performing work of different intensities such as uphill walking at different speeds or up and down stepping at different frequencies at altitudes of 1800 and 3000 m. above sea higher altitudes. The higher heart rate at altitude is due in all subjects ear function, though displaced towards the higher heart frequency at higher altitudes. The higher heart rate altitude is due in all subjects to a higher heart rate at rest. This, however seems to be partly compensated in some subjects by higher O_2 transport per beat when the work increases. The linear relationship between O_2 consumption and the heart rate would make it possible to calculate the O_2 consumption from the heart rate, and to calculate the maximum aerobic capacity from the pulse rate during submaximal work, if the maximum heart rate at altitude is known.

A64-81232
MODIFICATIONS OF THE HEMOGRAMME IN SWIMMERS AND GYMNASTS BY PHYSICAL EXERCISE AND THE FINNISH BATH, SAUNA.
Antonio Fornoza (Gimnasio Gen. Moscardo, Madrid, Spain).
Journal of Sports Medicine and Physical Fitness, vol. 4, Mar. 1964, p. 37-42.

Blood reactions were measured in athletes before, during and after exercise, and after 15 min. exposure in a sauna bath at 80° C and 32% relative humidity. It was found that after both exercise and the sauna the number of lymphocytes decreased significantly more than in the controls, while, taken as a whole the other leucocytes showed a significant increase. This is thought to be due to an involution of the thymus lymphatic tissue corresponding to a phase of contrashock and a beginning of adaptation. It is thought that heat or exercise stimulation induces hypophysis-suprarenal function and adaptation in athletics.

A64-81233
COMBINED INVESTIGATIONS OF CIRCULATION AND RESPIRATION AT DIFFERENT OXYGEN CONCENTRATIONS [KOMBINIERTE UNTERSUCHUNGEN VON KREISLAUF UND ATMUNG BEI UNTERSCHIEDLICHEN SAUERSTOFFKONZENTRATIONEN].
Hans Werner Kirchhoff (Flugmed. Inst. der Luftwaffe, Fürstenfeldbruck, Germany).
Wehrmedizinische Mitteilungen, no. 2, 1964, p. 23-26. In German.

The development of a procedure for flight fitness examinations at the Flugmedizinisches Institut der Luftwaffe is described. An evaluation involves simultaneous continuous registration of respiratory function (oxygen uptake, carbon dioxide excretion, respiratory quotient, respiratory volume, respiratory rate, respiratory minute volume, and respiratory equivalent) and cardiovascular function (pulse rate, systolic and diastolic blood pressure with its amplitude, and electrocardiogram) at oxygen concentrations of 21%, 14%, 12%, 10%, and 8%, for ten minutes at each concentration. Normal values established on 30 healthy subjects and deviations from these obtained from 30 pilots referred for flight fitness investigation are discussed with examples of differential diagnoses of hypertension and coronary circulation disturbances in early stages.

A64-81234
CUMULATIVE EFFECTS OF OXYGEN LACK ON THE ELECTRICAL PHENOMENA OF THE COCHLEA.
Ernesto Deutsch (Inst. Nacl. de Audiologia, Dept. of Physiol., Mexico City, Mexico).
Annals of Otology Rhinology and Laryngology, vol. 73, Jun. 1964, p. 348-357. 8 refs.
Novoa Found. supported research.

A study was performed in 34 cats to determine the effect of hypoxia on the action potential of the auditory nerve (AP) and on the cochlear potential (CP). The amplitude of the AP started to decrease after the first 30 to 50 sec. of oxygen deprivation and disappeared in about 70 sec. Recovery grew longer as each series of deprivations was carried out; but speed of recovery remained constant until the last. The CP showed a lower minimal value for amplitude, and recovery appeared later in the rest period than did the AP. The CP also showed a lower recovery value in all but the first rest period of recovery. Differences in the responses may be due to the presence of a hair cell-nerve junction in the auditory nerve and other complementary factors.

A64-81235
THE EAR AS A FREQUENCY ANALYZER.
R. Plomp (Inst. of Perception RVO-TNO, Soesterberg, Netherlands).
Journal of the Acoustical Society of America, vol. 36, Sep. 1964, p. 1628-1636. 26 refs.

The results of some experiments on the number of distinguishable partials of multitone signals with harmonic as well as inharmonic components are communicated. The frequency of the lowest partial was varied between 44 and 2000 c.p.s. The results are in agreement with the critical-band concept, indicating that the partials of a complex sound can be "heard out" only if their frequency separation exceeds the critical bandwidth. This fact supports the supposition that the critical bands correspond with the widths of the stimulating pattern of simple tones on the basilar membrane. The masking pattern of a complex tone of 500 c.p.s., determined over the frequency range between 300 and 4000 c.p.s., points in the same direction. An investigation of the minimum frequency separation required to distinguish the pitches of two-tone stimuli resulted in somewhat smaller values than the critical bandwidth, especially in the low-frequency range.

A64-81236
AUTOREGULATION IN SKELETAL MUSCLE.
Wendell N. Stainsby (Fla. U., Coll. of Med., Dept. of Physiol., Gainesville).
Circulation Research, vol. 15, Supplement No. 1, Aug. 1964, p. 39-45. 9 refs.

Skeletal muscles showed good isoemic autoregulation similar to that seen in other vascular beds. The autoregulated pressure flow curve was shifted upward when the metabolic rate was increased. Very high metabolic rates could cause maximal dilation and preclude isoemic autoregulation. In vascular beds showing isoemic autoregulation, an increased metabolic rate above resting would reduce duration of the transient period. Skeletal muscles also showed a variety of autoregulated responses, which appeared to be closely associated with metabolism or a relative metabolic supply of oxygen to tissues. None of the autoregulated phenomena was observed in a preparation which did not show all the others. Because of the inseparability of the autoregulated phenomena and the apparently close metabolic linkage of some of them, all of the autoregulated phenomena are metabolically linked or at least operate a common system that is metabolically linked.

A64-81237
EFFECTS OF FLOW RATE, VENOUS PRESSURE, METABOLITES, AND OXYGEN UPON RESISTANCE TO BLOOD FLOW THROUGH THE DOG FORELIMB.
Francis J. Haddy and Jerry B. Scott (Okla. U., Med. Center, Depts. of Physiol. and Med., Oklahoma City).
Circulation Research, vol. 15, Supplement no. 1, Aug. 1964, p. 49-59. 27 refs.
Grants No. PHS-G-HE-06759 and AHA-G-62-G-16.

Resistance to blood flow through the pump-perfused intact forelimb of a dog gradually increases in the first minute following a sudden large increase in flow rate. However, in the steady state, the resistance to flow with flow high is less than the resistance to flow with flow low. Hence, an active response is masked by passive dilation due to the rise in transmural pressure. The mechanism of the active response remains obscure, but the available evidence suggests a role for metabolites. The time course of the active response is consistent with the washout of metabolites, and the preparation is sensitive to administered metabolites. On the other hand, tissue pressure does not change a square wave transient increase in flow and, hence, pressure does not elicit a Bayliss-type response, and it is very difficult to demonstrate resistance changes in response to change in oxygen content of the blood. When flow is completely stopped and then restarted, the perfusion pressure slowly rises to the control value. This hypotension results both from reduced blood volume and active dilation. A small elevation of venous pressure at constant flow causes constriction of small vessels. This constriction does not appear to be related to tissue pressure, oxygen, metabolites, or a nonlocal reflex.

A64-81238
EVIDENCE FOR TISSUE OXYGEN DEMAND AS THE MAJOR FACTOR CAUSING AUTOREGULATION.
Arthur C. Guyton, J. M. Ross, Oliver Carrier, Jr., and James R. Walker (Miss. U., Med. Center, Dept. of Physiol. and Biophys., Jackson).
Circulation Research, vol. 15, Supplement No. 1, Aug. 1964, p. 60-69. 15 refs. NIH and Am. Heart Assoc. supported research.

Several different lines of evidence indicated that autoregulation could result from local regulation of blood flow in response to oxygen demand by tissues. The principal experiments suggesting such a mechanism were: (1) demonstration that vasodilation occurred in the hindlimb when arterial oxygen saturation was decreased; (2) demonstration of total-body vasodilation in cyanide and carbon monoxide poisoning; and (3) demonstration that minute isolated arteries dilated when the oxygen of the perfusing blood was decreased. Other experiments indicated that the existence of a vasodilator metabolite is unlikely. Therefore it is belived that vasodilation occurring in anoxia with a decrease in arterial pressure is caused by oygen deficiency as such in the vascular smooth muscle.

A64-81239
BLOOD FLOW THROUGH THE HUMAN FOREARM AND DIGITS AS INFLUENCED BY SUBATMOSPHERIC PRESSURE AND VENOUS PRESSURE.
A. David M. Greenfield (Queen's U. of Belfast, Dept. of Physiol., Northern Ireland).
Circulation Research, vol. 15, Supplement No. 1, Aug. 1964, p.70-75. 11 refs.

In a study of autoregulation of the blood flow rate in the human forearm and digits, three methods were used in order to increase transmural pressure: (1) inflation of a pneumatic cuff to a pressure causing venous congestion; (2) passive lowering of a limb from the horizontal to a dependent position, and (3) exposure of the limb to subatmospheric pressure. The effect of variations in transmural pressure on the flow at constant perfusion pressure was noted. An increase in flow indicated a decrease in resistance of blood vessels and vice versa. A progressive increase in transmural pressure caused: (1) a slight dilation of vessels that was followed by (2) constriction to less than their original caliber, and (3) final wide dilation of vessels. Step 2 indicated active autoregulation.

A64-81240
COMPARATIVE EFFECT IN HUMAN SUBJECTS OF CHLORMEZANONE, CHLORMEZANONE WITH ASPIRIN AND PLACEBO ON PERFORMANCE UNDER DELAYED AUDITORY FEEDBACK (DAF).
Robert B. Forney and Francis W. Hughes (Ind. U. School of Med., Dept. of Pharmacol. and Toxicol., Indianapolis).
Current Therapeutic Research, vol. 6, Oct. 1964, p.638-645. 7 refs.
Winthrop Labs., New York supported research.

Chlormezanone (2 dosage levels), chlormezanone plus aspirin, and placebo drug were studied for their effect on mental performance in 16 human subjects under a stress of delayed auditory feedback (DAF). Alcohol, alone and in combination with the above four medications, was included in the study. There was no significant alteration of performance by any of the drug treatments alone when compared with placebo medication. The alcohol used in the study represents low levels attained in moderate social drinking. Alcohol in this amount significantly impaired performance indicating the validity of the testing procedures. The symptom profile of the drugs suggested a subjective depression that was comparable to that of the sedative effect of alcohol. However, chlormezanone in both dosages and chlormezanone plus aspirin did not decrease the parameters of performance measured as did alcohol.

A64-81241
ALPHA-FREQUENCY OF ELECTROENCEPHALOGRAM AND A STABILIZER RETINAL IMAGE.
C. R. Evans and G. K. Smith (Nat. Phys. Lab., Autonomics Div., Teddington, Gt. Brit.).
Nature, vol. 204, Oct. 17, 1964, p. 303-304. 8 refs.

Changes of the alpha component of the human electroencephalogram occurring when a stabilized pattern disappears were investigated. Each trial was of 4-minutes duration from the time of the initial flash. The subject lay relaxed on a couch in a dimly lit room and was instructed to close his eyes as soon as the flash had been given, and report, by pressing a key, the occasions on which the target had totally disappeared. The image was a simple patterned target, consisting of a square with an inscribed cross. The subject's record indicated that total disappearance rarely, if ever, occurred in the first quarter (1 minute) of the run, and began to occur towards the end of the second quarter. The pattern had apparently totally disappeared for the final 1-1/2 minutes of the trial. Alpha was almost entirely absent in the first two minutes, and increased rapidly during the final two, reflecting the incidence of recorded disappearances. Further investigation suggests that the suppression of alpha is related to the presence of a pattern in the visual field, and not simply a function of visual shock or general disturbance of the subject.

A64-81242
BEHAVIOURAL RESPONSE OF RATS DURING INHALATION OF TRICHLOROETHYLENE AND CARBON DISULPHIDE VAPOURS.
M. E. Goldberg, H. E. Johnson, U. C. Pozzani, and H. F. Smyth, Jr. (Mellon Inst. Chem. Hyg. Fellowship, Pittsburgh, Pa.)
Acta Pharmacologica et Toxicologica, vol. 21, 1964, p. 36-44. 15 refs.
Grant No. NIH-G-OH-16.

Vapors of trichloroethylene or carbon disulphide were inhaled by rats selected on the basis of successful training to be 95% or more efficient in preventing shock on a discrete avoidance behavior schedule. After suitable acclimatization, the animals performed 5 days a week during the last hour of a 4-hour inhalation period. Animals were exposed to 125 p.p.m. of trichlorethylene for 5 weeks and to 195 p.p.m. of carbon disulphide for 3 weeks. Both agents caused significant alterations in behavior; however, carbon disulphide at this level also produced a significant loss in body weight. During the first few weeks of trichloroethylene inhalation, a reduced effectiveness was observed on Mondays, possibly attributable to elimination of the chemical during a weekend rest. Innovations in experimental design permitted behavioral evaluation during inhalation without the handling of animals and also inclusion of a post-exposure recovery period. Behavioral effects with either vapor were completely reversible during the recovery phase.

A64-81243
CARDIOVASCULAR RESPONSES TO BREATHHOLDING WHILE EXERCISING.
Ernest D. Michael Jr., Raymond Thornton, Frank D. Rohter, and George Holland (Calif. U., Environ. Stress Lab., Santa Barbara).

Journal of Sports Medicine and Physical Fitness, vol. 4, Mar. 1964, p. 28-31. 9 refs.
Grant No. UCAL-G-185.

Electrocardiograms were recorded during breathholding while exercising on a stationary bicycle. Subjects who were both trained divers and nondivers held their breath for 20 to 40 sec. after attaining a heart rate of 120 beats per min. In the trained divers, heart rate tended to decrease more than in the nondivers, but bradycardia was found in both groups. It is apparent that exercise will not prevent bradycardia response to hypoxia and carbon dioxide. Other evidence leads to the assumption that there is vasoconstriction during breathholding resulting in reflex cardiac slowing.

A64-81244
EFFECTS OF CARDIOVASCULAR REFLEXES ON NET CAPILLARY FLUID TRANSFER.
Bengt Oberg (Göteborg U., Dept. of Physiol., Sweden).
Acta Physiologica Scandinavica, Supplementum 229, vol. 62, 1964, p. 92-98. 126 refs. U. of Göteborg and Stiftelsen Wilhelm och Martina Lundgrens Vetenskapsfond supported research.
Contract No. AF 61(052)-732.
Grant No. PHS-G-HE-05675-05

The effects of various cardiovascular reflexes upon the net fluid exchange across the capillary membranes in skeletal muscle, skin, and intestine were studied in chloralose-anesthetized cats. The fluid movements between the intra- and extravascular compartments were followed by continuous measurements of tissue volume changes with a plethysmographic technique. This method, combined with measurements of blood flow and arterial and venous pressures, also allowed for a study of the reflex adjustments of the resistance vessels, the capacitance vessels, and the precapillary sphincters. Quantitative differences were observed with regard to the reflex-induced vascular adjustments in the various tissues studied. The reflex changes in total flow resistance and pre- to postcapillary resistance ratio were most pronounced throughout in the skeletal muscles, leading to especially marked reflex shifts in mean capillary pressure and net transcapillary fluid exchange in this tissue. The heart receptors seem to be of special importance for producing reflex shifts in heart activity, through they no doubt also contribute to the vascular adjustments.

A64-81245
THE EFFECT OF BLOOD PRESSURE UPON CHEMORECEPTOR DISCHARGE TO HYPOXIA, AND THE MODIFICATION OF THIS EFFECT BY THE SYMPATHETIC-ADRENAL SYSTEM.
K. D. Lee, R. A. Mayou, and R. W. Torrance (Oxford U., Lab. of Physiol., Gt. Brit.).
Quarterly Journal of Experimental Physiology, vol. 49, Apr. 1964, p. 171-183. 15 refs.
Med. Res. Council supported research.

The discharge in single- or few-fibre chemoreceptor preparations from the aortic nerve of the cat has been measured, and plotted against the prevailing blood pressure. If the blood pressure is raised mechanically, the relation between these two variables differs from that found when the pressure is raised reflexly or by catecholamines. It is suggested that the sympathetic-adrenal system may have a significant effect on the sensitivity of chemoreceptors.

A64-81246
THE CLINICAL PICTURE PARTICULAR TO A CHRONIC POISONING WITH BENZENE AND ITS HOMOLOGUES (TOLUENE AND XYLENE) IN WOMEN AGED OVER FORTY [K KLINIKE KHRONICHESKOGO OTRAVLENIIA BENZOLOM I EGO GOMOLOGAMI (TOLUOLOM I KSILOLOM) U ZHENSHCHIN STARSHE 40 LET].
G. L. Pombrak (Inst. for Adv. Training of Physicians, Leningrad, USSR).
Gigiena Truda i Professional'nye Zabolevaniia, vol. 8, 1964, p. 32-36. 10 refs. In Russian.

A study of female patients undergoing clinical treatment for benzol, toluol and xylol poisoning in the course of their employment revealed an age factor in regard to severity and duration of the episode. Older women showed a greater degree of leucopenia and anemia than the younger patients. At the beginning of the menopause in women after 40, tolerance of the female organism to benzol or its homologs was lower than in younger women. The effect of the intoxication continued even after the subjects had discontinued working with these compounds.

A64-81247
THE ROLE OF AGE ON THE ORGANISM'S ADAPTATION TO HYPOXIA (O ROLI VOZRASTNOGO FAKTORA V ADAPTATSII ORGANIZMA CHELOVEKA K NEDOSTATKU KISLORODA).
A. Z. Kolchinskaia.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 435-439. In Russian.

Comparative studies of the response of the human organism to the effects of atmospheric oxygen deficiency indicate that man, between the ages of 20 and 50, possesses a more effective and economical adaptation mechanism to hypoxia than very young or very old individuals. With a decrease in ambient oxygen concentration, an increase in pulmonary ventilation and blood flow rate enable the organism to maintain homeostatis, and assures normal body functions. The adaptive mechanism may vary in each caes. The increase in minute volume depends upon: (1) degree of hypoxia; (2) external temperature; (3) individual characteristics; (4) degree of training; and (5) functional state of the nervous system.

A64-81248
ANATOMICAL AND PHYSIOLOGICAL CHARACTERISTICS OF THE CHILD'S ORGANISM IN RESIDENTS OF HIGH ALTITUDE [NEKOTORYE DANNYE OB ANATOMO-FIZIOLOGICHESKIKH OSOBENNOSTIAKH ORGANIZMA DETEI, KORENNYKH ZHITELEI VYSOKOGOR'IA].
L. A. Briantseva.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 52-57. In Russian.

A survey of children, mostly of Kirgiz ancestry, between the ages of 7 and 16, who were born at an altitude of 2050 m. and remained permanent residents of the location, disclosed certain deviations from the normal physiological and morphological characteristics. The average height was less than normal, but the weight was within the normal limits. The thoracic girth was increased. The thoracic circumference-height ratio was increased by 1.18% in males and 1.27% in females. The vital capacity was increased. The respiration rate was normal; however, the minute respiratory volume was increased. The pulse rate was lower than normal, and a small group developed a slight bradycardia. The electrocardiogram showed, in general, low amplitudes, with the exception of the T wave which was in many instances of greater amplitude than normal. The blood flow rate was low. In 40% of the cases the capillary resistance was low. The high pulmonary ventilation and the low blood flow rate may provide better oxygen saturation of the blood in the pulmonary circulation. However, it is possible that the tissue requirements for oxygen are lower at high altitudes.

A64-81249
DISTURBANCES OF CARDIAC FUNCTIONS IN EXPERIMENTAL HYPOXIA IN YOUNG DOGS [EKSPERIMENTAL'NYE ISSLEDOVANIIA NARUSHENIIA SERDECHNOI DEIATEL'NOSTI PRI GIPOKSII U SHCHENKOV RANNEGO VOZRASTA].
N. V. Lauer, M. M. Koganovskaia, O. R. Kostenko, and M. S. Bondarevskii.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 58-63. In Russian.

The effect of hypoxia was studied in young and mature dogs. The animals were placed in a decompression chamber, in which the simulated altitude was varied from sea level to 15,000 m. Electrocardiograms were taken at every 1000 m. During the first few days after birth the animals subjected to hypoxia did not show any deviations from the normal electrocardiogram. As the animals matured, cardiac effects were registered in certain electrocardiographic variations: (1) the T wave amplitude was low; (2) the S-T segment and the T wave were increased. These deviations do not indicate a disturbance in the cardiac function, but rather, suggest a different cardiac structure during growth and development of the body, and a specific type of tissue metabolism during this period.

A64-81250
EFFECT OF ACUTE HYPOXIA ON THE STABILITY OF ERYTHROCYTES IN THE GROWING ORGANISM [O VLIIANII OSTROI GIPOKSII NA IZMENENIE KISLOTNOI REZISTENTNOSTI ERITROTSITOV RASTUSHCHEGO ORGANIZMA].
Iu. V. Semenov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 64-70. In Russian.

Moderate or acute hypoxia was induced in young and mature dogs either by placing them in a pressure chamber in which the amount of ambient oxygen was regulated or by a stricture of the trachea. Erythrograms were determined by the optical density of a blood sample hemolyzed in a 0.004 N HCl solution. In mature dogs hypoxia caused an increase in the number of erythrocytes in the circulating blood, with a consistent increase in their fragility. In young dogs hypoxia had no effect on the total number and the degree of fragility of the red blood cells.

A64-81251
EFFECT OF OLD AGE ON ADAPTATION TO ACUTE HYPOXIA [K VOPROSU O NEKOTORYKH OSOBENNOSTIAKH REAKTSII STARCHESKOGO ORGANIZMA NA OSTRUIU GIPOKSIIU].
M. M. Seredenko.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 79–85. In Russian.

In aged albino rats and dogs subjected to oxygen deficiency in a low-pressure chamber at various altitudes, the degree of adaptation to hypoxia was lower than in mature animals. Ataxia, involuntary micturition, and defecation were noted at lower altitudes in the aged animals than in mature animals. The recovery time of respiratory rate and volume and of the pulse rate was increased. The character of the electrocardiogram was changed. In the aged animals the physiological compensation of hypoxia, which consisted of an increase in pulmonary ventilation and oxygen uptake, did not produce an adequate oxygen saturation in the circulating blood sufficient for a rapid elimination of the oxygen debt.

A64-81252
EFFECT OF HYPOXIA ON TRANSMISSION OF IMPULSES IN THE MOTOR CENTERS OF THE BRAIN [VLIIANIE GIPOKSII NA RASPROSTRANENIE VOZBUZHDENIIA V DVIGATEL'NYKH OBRAZOVANIIAKH GOLOVNOGO MOZGA].
S. A. Dolina and G. P. Konradi.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 100–103. In Russian.

Rats with electrodes permanently implanted into the motor projection center of the frontal lobe of the cerebral cortex were subjected to hypoxia in a pressure chamber, in which various altitudes were simulated by sudden drops in pressure. Animals that exhibited convulsions upon electrical stimulation of the motor area showed an increase stimulus threshold at lower pressures. Their sensitivity to the effects of the central nervous system stimulants was increased with a slight decrease in ambient pressure. The results showed that moderate hypoxia, which does not lower the oxyhemoglobin concentration of the blood, increases the response threshold at the motor loci and helps to maintain the normal relationship of the activity of the cortical center.

A64-81253
EFFECT OF ACUTE HYPOXIA ON THE BIOELECTRIC ACTIVITY OF THE BRAIN CORTEX AND CERTAIN SUBCORTICAL AREAS [ISSLEDOVANIE BIOELEKTRICHESKOI AKTIVNOSTI KORY BOL'SHIKH POLUSHARII I NEKOTORYKH PODKORKOVYKH OBRAZOVANII PRI OSTROI GIPOKSII].
V. B. Malkin, A. N. Razumeev, and G. V. Izosimov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 104–111. In Russian.

Acute hypoxia was induced in rabbits placed in a low-pressure chamber, in which various altitudes were simulated. The animals had permanent electrodes implanted into the sensory-motor areas of the brain. Three phases in the change of the brain potentials under conditions of the increasing hypoxic hypoxia were observed: (1) stimulation of the high-frequency impulses; (2) predominance of slow waves of large amplitude; and (3) depression of potentials. These phases were evident in the electroencephalograms of the sensory-motor areas of the cortex, the reticular formation, and the hypothalamus; no changes were noted in the potentials of the hippocampus. The conclusion may be reached, that the effect of acute hypoxia of short duration, which causes a complete depression of potentials through the well defined phases, cannot be reduced to a simple mechanism of radiation of impulses.

A64-81254
POLAROGRAPHIC METHOD FOR THE STUDY OF HYPOXIA OF TISSUES IN LIVING ORGANISMS [POLIAROGRAFICHESKII METOD IZUCHENIIA GIPOKSII TKANEI ZHIVOGO ORGANIZMA].
E. A. Kovalenko, V. L. Popkov, and N. Cherniakov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 112–117. In Russian.

A polarographic method for the study of tissue hypoxia in living organisms was utilized in dogs. As a cathode, a plexiglass electrode with a platinum needle was implanted into the brain tissue. An ebonite rectangular electrode with a silver chloride tip, or an ear clip with a silver chloride plate, served as an anode. The system permits a study of oxygen partial pressure in the brain tissue under conditions of: (1) low ambient pressure; (2) acceleration stress; (3) inhalation of pure oxygen under high tension, or of various gas mixtures; and (4) introduction of various pharmaceutical agents into the organism.

A64-81255
OXYGEN TENSION IN BRAIN TISSUES OF DOGS BREATHING GASEOUS MIXTURES [NAPRIAZHENIE KISLORODA V TKANIAKH GOLOVNOGO MOZGA SOBAK PRI DYKHANII GAZOVYMI SMESIAMI].
E. A. Kovalenko, V. L. Popkov, and I. N. Cherniakov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 118–125. In Russian.

Oxygen tension was determined by the polarographic method in the brain tissues in dogs inhaling various gaseous mixtures. The following results were obtained: (1) pure oxygen increased the oxygen saturation of the brain tissues by 50%; (2) 5% to 10% oxygen concentration in the atmospheric air caused a decrease by 38% in the cortex, and by 53% in the subcortical areas; (3) a mixture of atmospheric air and 10% CO_2 showed an increase by 42%; (4) 92.5% O_2 and 7.5% CO_2 mixture produced an increase of 325%; and (5) atmospheric air containing 7.5% O_2 and 7.5% CO_2 resulted in a normal or slightly increased oxygen saturation.

A64-81256
EFFECT OF HYPOXIA ON THE CENTRAL NERVOUS SYSTEM [ENERGETICHESKIE POKAZATELI SOSTOIANIIA TSENTRAL'NOI NERVNOI SISTEMY PRI GIPOKSII].
V. A. Berezovskii.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 126–131. In Russian.

Determination of the oxygen saturation of the brain tissues in dogs by a polarographic method produced the following results: (1) a temporary occlusion of one of the four major cervical arteries in dogs caused a decrease in the oxygen tension, and an increase in the temperature of the brain tissues; and (2) the radiation of impulses through the cerebral tissues, as a result ot the hypoxic state of the central nervous system, produced an increase in the thermal conductivity of the brain tissues.

A64-81257
PHYSIOLOGICAL ADAPTATION OF AN ORGANISM TO HYPOXIA (O POTENTSIAL'NYKH PRISPOSOBITEL'NO-KOMPENSATORNYKH FUNKTSIIAKH ORGANIZMA PRI GIPOKSII).
I. M. Khazen.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 141–146. In Russian.

Pilots of supersonic craft are under physical and emotional strain that affects their respiratory rate (often resulting in hypoxia), cardiac rate, and other physiological parameters. The strain leads to a decrease of the subjects' performance capacity. A study of the neural and glandular systems of the intestinal tract indicates that a prophylactic approach is necessary to prevent exhaustion of the mechanisms of the central nervous and humoral systems. Normalization of the metabolic processes can be achieved by the use of an adequate diet supplemented by vitamins, such as thiamine, citrin, and ascorbic and para-aminobenzoic acids. In certain cases the use of pharmaceutical agents is advisable.

A64-81258
ADAPTATION OF THE ADULT ORGANISM TO HYPOXIA AND THE ROLE OF THE CENTRAL NERVOUS SYSTEM IN THIS PROCESS [OB ADAPTATSII VZROSLOGO ORGANIZMA K NEDOSTATKU KISLORODA I ZNACHENII VYSSHIKH OTDELOV MOZGA V ETOM PROTSESSE].
N. V. Lauer, A. Z. Kolchinskaia, and V. V. Turanov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 147–159. In Russian.

The effect of hypoxia was studied in normal dogs in the low-pressure chamber, by the use of a spirometer with various gas mixtures, and under natural conditions of high altitude. The same effect was also investigated on anesthetized animals, and in animals with cerebral decortication. In normal animals moderate hypoxia resulted in an increase of the respiratory volume and respiratory rate. Severe hypoxia caused an increase in respiratory rate, a decrease in alveolar ventilation, and an increase in heart rate. An ambient oxygen concentration drop to 7% produced a sudden increase in blood pressure with a simultaneous decrease in cardiac rate. At this concentration the oxygen saturation of the blood remained normal, but an increase in the red count was noted. Dogs under anesthesia, or with decortication did not show the same degree of response. The conclusion may be drawn that a disturbance of the body function by the control of the nervous system, by the exclusion of cerebral cortex, decreased the reflex action which plays the basic role in the adaptive mechanism to hypoxia.

A64-81259
ADAPTATION OF AN ADULT HUMAN ORGANISM TO HYPOXIA [K VOPROSU OB ADAPTATSII ORGANIZMA VZROSLOGO CHELOVEKA K NEDOSTATKU KISLORODA].
V. V. Turanov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 160–169. In Russian.

Experiments were conducted on the same individuals both in the decompression chamber and at high altitude. At moderate elevation (below 3000 m.) the first response to hypoxia was that of the respiratory system. The minute respiratory volume was increased by the increase in the tidal volume; respiratory rate and cardiac rate remained normal at higher elevations (above 3000 m.); the pulse rate increased; red blood count and hemoglobin concentration showed higher values than normal. At the 3000 m. altitude the response was due to the activity of the cerebral cortex. The electrocardiogram showed a decrease in the T-P interval, and an increase in the R wave magnitude. The drop in the oxygen tension of the peripheral blood can not be sufficiently compensated by the increase of the red count and hemoglobin content. As a result, the subject experiences discomfort. During sleep or under anesthesia, the activity of the adaptive mechanisms is retarded.

A64-81260
THE ROLE OF THE FUNCTIONAL STATE OF THE CENTRAL NERVOUS SYSTEM IN THE MECHANISM OF INTERACTION OF THE RESPIRATORY AND CIRCULATORY CENTERS UNDER VARIOUS STATES OF HYPOXIA [ZNACHENIE FUNKTSIONAL'NOGO SOSTOIANIIA TSENTRAL'NOI NERVNOI SISTEMY V MEKHANIZMAKH VZAIMODEISTVIIA DYKHATEL'NOGO I SOSUDODVIGATEL'NOGO TSENTROV PRI RAZLICHNYKH VIDAKH GIPOKSII].
La. M. Britvan.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 169–177. In Russian.

Experiments were conducted on rabbits in a state of shock after intravenous injections of normal horse blood serum, and on cats that were denied inhalation of air. The relationship between the respiratory and cardiovascular brain center activity varied under various kinds of hypoxia (anaphylactic shock, asphyxia, or an increase in intracranial pressure). This interdependence varied with the intensity and duration of hypoxia and the initial state of the central nervous system. In these types of hypoxia, in contrast to hypoxemia, the primary response is an increase in blood pressure. However, in all cases of hypoxia the brain cortex exhibits high sensitivity.

A64-81261
THE REFLEX MECHANISM OF PERIODIC RESPIRATION IN HYPOXIA [REFLEKTORNYI MEKHANIZM PERIODICHESKOGO DYKHANIIA PRI GIPOKSII].
A. I. Khomaziuk.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 185–189. In Russian.

Periodic breathing may be a result of the relative CO_2 and O_2 tensions in the circulating blood. Dogs under light anesthesia, inhaled a 10% oxygen and 90% nitrogen mixture. The simultaneous values of the oxygen tension of blood in the carotid arteries, the arterial and venous blood pressure, and the pressure in the heart and the pulmonary arteries were also recorded. The experiments were repeated with periodic breathing induced by injections of sodium amytal solution. The ensuing hypoxia was registered by lowering of oxygen tension in the carotid arteries, which led to an increase in respiration, pulse, cardiac stroke, and blood pressure of the systemic circulation. The systolic pressure in the carotid arteries was increased, but the diastolic pressure was lowered. Upon return to normal air inhalation, the first breath caused apnea, which was the result of the sudden increase in oxygen tension of the blood in the carotid arteries, which however, did not reach the normal level. In the period of recovery from hypoxia, periodic respiration ensued during the organism's normalization of the carotid chemoreceptors' threshold of sensitivity.

A64-81262
REGULATION OF GAS EXCHANGE IN HYPOXEMIA [O REGULIATSII GAZOOBMENA PRI GIPOKSEMII].
A. D. Slonim.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 190–195. In Russian.

Experimental results and observations on animals and man during the period of adaptation to atmospheric oxygen deficiency could not reveal a definite mechanism of the process of adaptation. The tissue gas exchange was either affected or remained unchanged. As a rule, hypoxia of short duration either increased or decreased the gas exchange. However, prolonged exposure to hypoxia resulted in normal oxygen uptake. Low temperatures associated with high altitudes could play a role in the hypoxic effect. A depression of the thermoregulatory tonus of the skeletal muscles was usually observed during hypoxia and may be considered as one of the factors.

A64-81263
DEVELOPMENT OF TOLERANCE TO THE TOXIC EFFECTS OF OXYGEN EXCESS IN ANIMALS BY HYPOXIA TRAINING [O POVYSHENII USTOICHIVOSTI ZHIVOTNYKH K TOKSICHESKOMU DEISTVIIU IZBYTKA KISLORODA PUTEM GIPOKSICHESKOI TRENIROVKI].
A. G. Zhironkin.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 353–358. In Russian.

Increased tolerance to the toxic effects of excess oxygen in the ambient air was successfully accomplished on small animals by subjecting them to simulated low barometric pressure equivalent to 6000 m. altitude in a low pressure chamber for 4–5 hours during 3 or 4 consecutive days. At the end of this period the animals were subjected to a sudden change to pure oxygen under 4.5–6 atmospheres pressure. These animals could withstand higher concentrations of atmospheric oxygen without toxic effects. Tissue adaptation and changes in basal metabolism could be considered the basic factors fo the adaptive mechanism. The same type of training could be used in cases of hyperoxia.

A64-81264
THE ROLE OF OXYGEN IN REDUCING THE UNDESIRABLE EFFECTS OF HIGH CARBON DIOXIDE CONCENTRATION IN THE ORGANISM [ROL' KISLORODA V SNIZHENII NEBLAGOPRIIATNOGO VOZDEISTVIIA NA ORGANIZM POVYSHENNYKH KONTSENTRATSII UGLEKISLOTY].
T. N. Zheludkova, V. P. Zagriadskii, O. Iu. Sidorov, and E. K. Sulimo-Samuillo.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 359–363. In Russian.

Rabbits kept in an airtight chamber, in which the O_2 and CO_2 concentrations could be regulated, showed a favorable effect of high O_2 concentration on the state of hypercapnia. A prolonged exposure to an atmosphere containing 3% to 5% CO_2 and 35% O_2 resulted in less pronounced physiological effects, faster recovery, and greater tolerance to transverse radial acceleration stress than under conditions of 3% to 5% CO_2 and 21% O_2.

A64-81265
UTILIZATION OF OXYGEN AND THE REMOVAL OF CARBON DIOXIDE IN THE ORGANISM DURING BREATHING UNDER INCREASED PRESSURE [POGLOSHCHENIE KISLORODA I VYVEDENIE UGLEKISLOTY ORGANIZMOM PRI DYKHANII POD IZBYTOCHNYM DAVLENIEM].
P. F. Vokhmianin.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 364–367. In Russian.

Under pressure-breathing conditions, dogs wearing masks showed that the O_2 pressure equivalent of a 300 mm. water column caused a lowering of oxygen consumption by the tissues and interfered with carbon dioxide removal. Hypoxia ensued even at normal altitude, when pure oxygen was given, regardless of changes in pulmonary ventilation. It was caused by an increase in interpulmonary pressure, resulting in a decrease in volume of the circulating blood and in the blood flow rate. These conditions created a lack of venous return. Hyperventilation could increase the state of hypercapnia. However, oxygen and carbon dioxide concentration in the alveolar air did not coincide with O_2 and CO_2 concentration in the peripheral blood. Upon removal of the mask, normalization of the physiological processes was retarded because of hyperemia and pulmonary edema due to recovery from venous stasis.

A64-81266
IONIC DISPLACEMENT IN THE ORGANISM OF MAN AND ANIMALS IN HYPOXIA OF VARIOUS ORIGINS (LOW BAROMETRIC PRESSURE, ACCELERATION AND VIBRATIONS) [K VOPROSU OB IONNYKH SDVIGAKH V ORGANIZME CHELOVEKA I ZHIVOTNYKH PRI IAVLENIIAKH GIPOKSII RAZLICHNOGO PROISKHOZHDENIIA (PONIZHENNOE BAROMETRICHESKOE DAVLENIE, USKORENIIA, VIBRATSII)].
A. S. Barer.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 368–373. In Russian.

Ion migration in the tissues of the human and animal organism was determined on the basis of potassium and sodium concentration in urine, saliva, and blood. The common response of the organism to various stresses (low pressure, acceleration, and vibrations) was tissue hypoxia, primarily in the brain. At low altitudes, hypoxic hypoxia was noted. Acceleration caused circulatory hypoxia. Vibrations produced a combination of hemodynamic disturbances and tissue hypoxia. Migration of sodium and potassium ions in the interstitial fluid evidently depends upon the degree of permeability of the cell membranes in regard to these ions.

A64-81267
RESISTANCE TO HYPOXIA EFFECT IN RATS SUFFERING FROM ACUTE RADIATION SICKNESS [REZISTENTNOST' KRYS K GIPOKSII PRI OSTROI LUCHEVOI BOLEZNI].
S. V. Gasteva, K. P. Ivanov, and D. A. Chetverikov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 374-379. In Russian.

Albino rats were subjected to whole-body irradiation of 750 r. The animals were elevated to a simulated altitude of 12,000 m., at various periods after irradiation. Animals tested for hypoxic effects, 48 to 72 hours after exposure, showed greater tolerance to hypoxia. This was evidently due to the lowering of metabolism concurrent with slight hyperemia, due, in all probability, to starvation and other effects. Gas exchange following irradiation dropped considerably below that observed in controls. Animals subjected to hypoxia 96 hours after the irradiation, showed the same response as the controls. Although, at this stage the metabolism remained low, the lethal effect of hypoxia could be due to the terminal phase of radiation sickness. Tolerance noted 6 to 24 hours after exposure could not be related to metabolic changes, but rather depended on other factors, which will require further study.

A64-81268
MODERN CONCEPTS OF CHANGE IN THE CHEMICAL STATE OF THE CELL DURING ADAPTATION TO HYPOXIA [SOVREMENNYE PREDSTAVLENIIA O PERESTROIKAKH KLETOCHNOGO KHIMIZMA V PROTSESSE AKKLIMATIZATSII K GIPOKSII].
Z. I. Barbashova.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 380-386. In Russian.

A study of the physical properties of muscle protein involved in contractile action was performed on the muscular tissue of rats. The viscosity of actomyosin changed, upon dilution at the same degree, whether the protein was isolated from normal animals or from those adapted to hypoxic conditions. This indicates that adaptation did not change the size or structure of the protein molecule. However, adenosine triphosphate (ATP) action reduced actomyosin viscosity because of the dissociation of protein into actin and myosin. Upon recovery, the actin and myosin molecules combined to form a molecule of actomyosin, which possessed a normal degree of viscosity. However, the recovery time was reduced after a hypoxic experience.

A64-81269
PHYSIOLOGICAL AND BIOCHEMICAL MECHANISM OF ADAPTATION TO HIGH ALTITUDES [O FIZIOLOGO-BIOKHIMICHESKIKH MEKHANIZMAKH ADAPTATSII K VYSOKOGORNYM USLOVIIAM].
P. A. Korzhuev.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 387-391. In Russian.

Moutain sheep and goats showed higher hemoglobin and myoglobin concentrations and an increase in the erythrocyte number and the hematocrit, as compared with domesticated species.

A64-81270
OXYGEN-COMBINING PROPERTIES OF BLOOD HEMOGLOBIN IN THE ORGANISM DURING ADAPTATION TO CHRONIC HYPOXIA [KISLORODSVIAZYVAIUSHCHIE SVOISTVA GEMOGLOBINA KROVI PRI AKKLIMATIZATSII ORGANIZMA K USLOVIIAM KHRONICHESKOI GIPOKSII].
V. I. Voitkevich.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 404-408. In Russian.

The oxyhemoglobin dissociation curve was studied in several generations of rats kept in environmental chambers and subjected to hypoxia by maintaining the ambient air at a constant composition of 89.5% N^2 and 10.5% O^2 at normal pressure. Hypoxic animals of the eleventh to thirteenth generation showed a shift in the oxyhemoglobin dissociation curve in 55% to 57% of cases. In the majority of cases, the shift was to the left in the area of the upper inflexion. In 30% of the cases it was to the right in the area of the lower inflexion. In some cases the shift was noted simultaneously to the left in the upper inflexion, and to the right in the area of the lower inflexion. The oxyhemoglobin dissociation curves indicate the respiratory function of blood and the hemoglobin affinity to oxygen, and may serve as indices of the greatest degree of adaptation to hypoxia.

A64-81271
COMBINED POTASSIUM AND SODIUM SALTS ION EXCHANGE BETWEEN ERYTHROCYTES AND BLOOD PLASMA IN MAN UNDER CONDITIONS OF VARIOUS PARTIAL PRESSURE OF OXYGEN [SOPRIAZHENNYI IONNYI OBMEN SOLEI KALIIA I NATRIIA MEZHDU ERITROTSITAMI I PLAZMOI KROVI CHELOVEKA PRI RAZLICHNYKH PARTSIAL'NYKH DAVLENIIAKH KISLORODA].
I. M. Dediulin.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 409-410. In Russian.

The potassium concentration of blood plasma in man is higher at high altitudes than at near sea level. The reduction of carbonic acid in the pulmonary circulation and the ensuing alkalosis lead to an increase in potassium concentration in the peripheral blood. This fact indicates an adsorption mechanism of the cell membrane permeability and suggests hemoglobin and oxyhemoglobin as the basic buffer system of the sodium potassium shift between the erythrocytes and plasma.

A64-81272
CERTAIN FINDINGS ON HYPOXIA AND ADAPTATION [MATERIALY K VOPROSAM GIPOKSII I AKKLIMATIZATSII].
L. G. Filatova.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 411-414. In Russian.

A study of the effects of hypoxia on human and animal organisms in the Kirgizia region, at 760 to 2500 meter altitude, did not disclose a basic mechanism of adaptation. Both animals and men showed a lowering of the energy expenditure level. The thyroid gland may play a role in this mechanism. The extero-receptors (vision, hearing, and smell) may also take a part in adaptation. The exclusion of these receptors resulted in an increase of hypoxia tolerance.

A64-81273
ADAPTATION MECHANISM OF THE ORGANISM AT HIGH ALTITUDE [K VOPROSU O PRISPOSOBITEL'NYKH MEKHANIZMAKH ORGANIZMA K USLOVIIAM VYSOKOGOR'IA].
B. T. Turusbekov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 415-420. In Russian.

The first phase of adaptation to hypoxia is nervous stimulation of hemodynamics and respiration. During the second phase, the specific (oxygen deficiency) and nonspecific (pressure, temperature, humidity, and illumination) stimuli are differentiated resulting in the adjustment of organic functions. The third phase combines the further development and improvement of functions, with structural changes, which could be passed on to the next generation. Unlike experimental conditions of simulated constant pressures, the natural conditions vary from day to day. Therefore, the natural process of adaptation to high altitudes proceeds unevenly under the effect of specific and nonspecific factors.

A64-81274
CERTAIN FINDINGS ON THE STUDY OF ADAPTATION TO HIGH ALTITUDES IN THE KIRGIZ USSR [MATERIALY K AKKLIMATIZATSII K VYSOKOGOR'IU KIRGIZII].
M. M. Mirrakhimov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].
Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 421-429. In Russian.

Adaptation to high altitudes (1500-1800 m.) in the Kirgizia region for a long period of time led to changes in certain functions of the organism, such as those of the cardiovascular system, which became adjusted to more efficient utilization of oxygen. The gas exchange level became lower. The hemoglobin concentration was higher, although the red blood count remained normal. Pulse rate, arterial pressure, and blood flow rate decreased. Venous pressure, capillary permeability and pulmonary circulation showed an increase. A general depression in body function level was evident. Under such circumstances the minute cardiac volume, an indicator of hemodynamic activity, remained normal.

A64-81275
CHANGES IN THE NERVOUS SYSTEM AT AN ALTITUDE OF 2000 METERS [IZMENENIIA V NERVNOI SISTEME NA VYSOTE 2000 M].
L. M. Telcharov, N. Nikolov, and St. Chernaev.
IN: OXYGEN DEFICIENCY (KISLORODNAIA NEDOSTATOCHNOST'). Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 735–739. In Russian.

At an altitude of 2,000 meters, changes in the functional state of the human organism were observed in subjects not accustomed to it. The brain cortex activity was stimulated, and the impulses were radiated to the centers of the autonomic nervous system, which caused an increase in neurovascular activity. The respiratory stem was not affected to a significant degree, because the nervous system had sufficient power to maintain the necessary adjustment. However, a prolonged stay at high altitude could produce a permanent stress on the nervous system assuming pathological dimensions.

A64-81276
THE IMPORTANCE OF THE OXYGENOMETRIC DETERMINATION OF THE BLOOD CIRCULATION RATE AND THE LEVEL OF THE OXIDATION PROCESS IN THE EVALUATION OF THE DEGREE OF ADAPTATION TO HIGH ALTITUDE [ZNACHENIE OKSIGEMOMETRICHESKOGO OPREDELENIIA SKOROSTI KROVOTOKA I UROVNA OKISLITEL'NYKH PROTSESSOV PRI OTSENKE AKKLIMATIZATSII K VYSOKOGORNYM USLOVIIAM].
A. M. Tiurin.
IN: OXYGEN DEFICIENCY (KISLORODNAIA NEDOSTATOCHNOST'). Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 435–439. In Russian.

Clinical examinations of a group of Soviet skiers training for the Olympic Games at an altitude of 1500 to 2000 m. disclosed the following physiological changes: (1) pulse rate was decreased; (2) blood pressure was lowered; (3) hemoglobin content values were lower than normal; (4) blood flow rate was increased; (5) oxygenating process was more intensive; and (6) fatigue-recovery time was shortened.

A64-81277
EFFECT OF HIGH ALTITUDE ON THE REFLEX RELATIONSHIP OF KIDNEY AND SALIVARY GLAND ACTIVITY [VLIIANIE FAKTOROV VYSOKOGOR'IA NA REFLEKTORNYE VZAIMOOTNOSHENIIA DEIATEL'NOSTI POCHEK I SLIUNNYKH ZHELEZ].
E. P. Esipenko.
IN: OXYGEN DEFICIENCY (KISLORODNAIA NEDOSTATOCHNOST'). Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 440–445. In Russian.

Dogs with permanent parotid gland and stomach fistulas and with their ureters excluded to the skin surface, were studied at an altitude of 2000 to 3200 m. to establish the possible effect of high altitude on the relationship between salivary gland activity and kidney function. The animals were given 500 ml. of water at 36°–38° C through the stomach fistula. Urine was collected every 15 min.; saliva specimens were taken every two min. The kidney-salivary gland function was found to be different at high altitude from that at near-sea level. This effect could be explained by the effect of hypoxia on the central nervous system. Oxygen deficiency led to a disturbance in reflex coordination between digestive functions and others, such as cardiac activity and respiration. As a result, saliva secretion was depressed and urine output increased. Prolonged stay at high altitude led to normalization of these functions.

A64-81278
KIDNEY FUNCTION AT HIGH ALTITUDE [MOCHEOBRAZOVATEL'NAIA FUNKTSIIA POCHEK V USLOVIIAKH VYSOKOGOR'IA].
B. E. Esipenko and A. P. Kostromina.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 446–452. In Russian.

Kidney function was studied at near-sea level and at altitudes of 2000 m. and 3200 m. in dogs that were provided with a stomach fistula and had their ureters excluded to the skin surface. The following conclusions were reached: (1) Urine volume increased with an increase in altitude. (2) An increase in water intake resulted in an increase in urinary volume at 2,000 meters; but at higher altitudes normalization or even a fall below normal was noted. (3) The amount of solids increased with altitude; however, without forced water intake, values were lower than at near-sea level. (4) Changes in the urine formation process are the result of water equilibrium dynamics under conditions of high altitude, and are directed toward aqueous homeostasis of the organism.

A64-81279
NEUROHUMORAL CHANGES IN THE BLOOD OF ANIMALS AT HIGH ALTITUDE [NEIROGUMORAL'NYE SDVIGI V KROVI ZHIVOTNYKH V USLOVIIAKH VYSOKOGOR'IA].
G. I. Kulik.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 453–455. In Russian.

Neurohumoral changes were studied in dogs and domestic fowl under conditions of high altitudes. The inotropic and cholinesterase activity of the blood serum increased at 2,000 meters. However, at higher altitudes, values began to return to normal.

A64-81280
CHANGES IN BLOOD PRESSURE, CARDIAC RHYTHM AND RESPIRATION IN THE NORMAL AND HYPOTHYROID STATE AT HIGH ALTITUDES [IZMENENIIA ARTERIAL'NOGO DAVLENIIA, SERDECHNOGO RITMA I DYKHANIIA PRI NORMAL'NOI I PONIZHENNOI FUNKTSII SHCHITOVIDNOI ZHELEZY V USLOVIIAKH VYSOKOGOR'IA].
M. I. Imanaliev.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 456–460. In Russian.

The effects of the hypothyroid state on adaptation to hypoxia at 3,200 m. altitude was studied on dogs with hypothyroidism induced by oral intake of 6-methylthiourocil (50 mg per 1 kg of body weight) for 11 to 12 days. At near-sea level, blocking of thyroid gland function resulted in (1) depression of blood pressure without significant changes in cardiac activity, (2) slight increase in respiratory rate, and (3) a decrease in amplitude of thoracic movements. In hypothyroid animals exposed to an altitude of 3,200 m., blood pressure was lowered, with a simultaneous increase in pulse and respiration rates. It is known that hypothyroidism depresses metabolism of the body. Therefore, animals with hypothyroidism could tolerate high altitude better than the normal control.

A64-81281
EFFECT OF VITAMINS ON THE FUNCTION OF THE ADRENAL CORTEX IN RESIDENTS OF THE PAMIR AT 3700 METERS ALTITUDE [VLIIANIE VITAMINOV NA FUNKTSIONAL'NOE SOSTOIANIE KORY NADPOCHECHNIKOV U MESTNYKH ZHITELEI VOSTOCHNOGO PAMIRA (VYSOTA 3700 M NAD UROVNEM MORIA)].
V. M. Braginskii and M. M. Mirzoev.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 461–464. In Russian.

A determination of the 24-hour output of 17-ketosteroids was conducted on a group of residents of the Pamir, at an altitude of 3700 m., as an indicator of the functional state of the adrenal cortex. Large doses of vitamins (50 mg. riboflavin, 100 mg. vitamin E and 500 micrograms biotin) given daily, increased the functional state of the adrenal cortex. However, daily doses of 30 mg. folic acid reduced adrenal cortex activity.

A64-81282
VARIATIONS IN THE EOSINOPHIL COUNT AT HIGH ALTITUDES [IZMENENIE KOLICHESTVA EOZINOFILOV V USLOVIIAKH VYSOKOGOR'IA].
P. V. Beloshitskii and Lo Sin'-Mao.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 472–475. In Russian.

Experiments on guinea pigs in pressure chambers, and studies conducted on guinea pigs, mice, and human subjects at altitudes of 2,000 and 3,500 m. produced the following results: (1) Low barometric pressure stimulated the activity of the hypophysis–adrenal system, as was indicated by the lowered eosinophil count of the peripheral blood. (2) Injections of adrenocorticotrophic hormone under the same conditions led to a further drop in the eosinophil count, which was beginning to normalize.

A64-81283
CHANGES IN RED BLOOD COUNT, PULSE RATE AND BLOOD PRESSURE DURING AN ASCENT, IN THE INDIVIDUALS ADAPTED TO HIGH ALTITUDES [IZMENENIE KRASNOI KROVI, CHASTOTY PUL'SA I KROVIANOGO DAVLENIIA NA VYSOTE VOSKHOZHDENIIA POSLE PREDVARITEL'NOI AKKLIMATIZATSII V USLOVIIAKH VYSOKOGOR'IA].
A. B. Zakharian.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 476–478. In Russian.

Clinical and laboratory examinations were performed on young men between 20 and 26, before and after an ascent from an altitude of 3,250 meters to 3,900 meters. The subjects formed 4 groups that lived at the 3,250 meter altitude for the following different periods of

time prior to the study: (a) 1 month; (b) 1 to 6 months, (c) 6 to 12 months, and (d) over 12 months. The increase in blood pressure, pulse rate, hemoglobin content, and red blood cell count was more pronounced in the individuals who were less adapted to high altitude.

A64-81284
NORMAL VALUES FOR BLOOD PRESSURE IN RESIDENTS OF HIGH ALTITUDES IN THE KIRGIZ USSR [O NORMATIVAKH ARTERIAL'NOGO DAVLENIIA U KORENNYKH ZHITELEI VYSOKOGORNYKH RAIONOV KIRGIZII].
A. T. Tynybekov.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 509-512. In Russian.

Comparative studies of blood pressure values of inhabitants of the lowlands and of the Kirgizia Mountains disclosed that blood pressure levels were lower in the residents of the Kirgizia highlands than in the inhabitants of Leningrad or Moscow as far as individuals under 29 were concerned. However, older persons did not show such variations.

A64-81285
A BASIS FOR THE AUTOMATIC DIAGNOSIS OF HYPOXIA [OSNOVY AVTOMATICHESKOI DIAGNOSTIKI GIPOKSICHESKOGO SOSTOIANIIA].
V. B. Malkin.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 563-571. In Russian.

A polygraphic method for registering various physiological functions simultaneously, in order to detect the most important deviations from normal, would be a valuable tool for an automatic diagnosis of the hypoxic state. It should provide for: (1) photometric determination of oxygen saturation of the arterial blood; (2) determination of changes in rhythm, rate, and volume of respiration; (3) electrocardiography; (4) blood pressure readings; and (5) electroencephalography.

A64-81286
OXYGEN DEFICIENCY (HYPOXIA AND ADAPTATION TO HYPOXIA) [KISLORODNAIA NEDOSTATOCHNOST' (GIPOKSIIA I ADAPTATSIIA K NEI)].
Edited by A. F. Makarchenko (Ukrainian SSR Akad. Nauk, Inst. Fisiol., Kiev).
Kiev, Akad. Nauk Ukrainskoi SSR, 1963, 610 p. 650 refs. In Russian.

A detailed review of the physiological effects of hypoxia on the human organism, with special consideration to adaptation mechanisms, is presented. Forty-five of the papers are abstracted and indexed.

A64-81287
PHYSIOLOGY OF ADAPTATION TO HIGH ALTITUDES [SRAVNITEL'NAIA FIZIOLOGIIA AKKLIMATIZATSII K VYSOKOGORNOMU KLIMATU].
N. N. Sirotinin.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 3-13. In Russian.

The human organism is sensitive to atmospheric oxygen deficiency, but possesses a mechanism of adaptation which begins to function at the early stages of hypoxia. Early compensation for oxygen deficiency brings about an increase in pulmonary ventilation and blood circulation. The erythrocytes discharged from the reservoirs into the active circulation have a tendency to degenerate faster than the normal cells. Products of their disintegration act as stimuli for an increase in the hemotopoiesis. The red cell count and the hemoglobin concentration rise gradually with a simultaneous normalization of pulmonary ventilation and blood flow rate. The increase in the total erythrocyte oxygenating surface area results in a certain shift of tissue mechanisms.

A64-81288
EFFECT OF HYPOXIA ON CONDITIONED REFLEXES IN FISH [VLIIANIE GIPOKSII NA USLOVNYE REFLEKSY RYB].
T. A. Aref'eva.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 20-24. In Russian.

In goldfish, conditioned reflexes (food searching after a light or sound signal) were affected to a higher degree by changes in the hydrostatic pressure than by oxygen insufficiency. With a sufficient oxygen concentration (1.7 ml./cm.^{3}) the change in hydrostatic pressure (200- to 300-meter water depth) led to impairment of the conditioned reflexes, which resulted in a decrease of the number of positive reactions. A complete suppression of conditioned reflexes occurred when the oxygen concentration reached 0.3 to 0.22 cm. ^{3}/l. This concentration represents a lethal threshold. At this state the fish exhibits a severe condition of asphyxia.

A64-81289
ELECTROCARDIOGRAM OF RACERS (SNAKES) UNDER NORMAL CONDITIONS AND DURING HYPOXIA [ELEKTROKARDIOGRAMMA POLOZOV V OBYCHNYKH USLOVIIAKH I PRI GIPOKSII].
V. I. Danileiko.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 25-28. In Russian.

In snakes a fall of barometric pressure produced no effect on the function of the cardiovascular system. The reptiles exhibited a remarkable ability to adapt to the low oxygen partial pressure of the inhaled air. Their electrocardiograms showed a slight effect at an altitude of 3,000 meters. The Q-T and R-R intervals and the amplitude of the T wave were slightly decreased. The physical stress induced by placing the animals in the vertical position resulted in a more pronounced deviation from the normal electrocardiogram.

A64-81290
PHYSIOLOGICAL DEVIATION IN HEMATOPOIESIS IN ANIMALS AT HIGH ALTITUDE [SRAVNITEL'NO-FIZIOLOGICHESKIE OSOBENNOSTI FUNKTSII KROVOTVORENIIA U ZHIVOTNYKH V USLOVIIAKH VYSOKOGORNOGO KLIMATA].
N. M. Shumitskaia.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 29-33. In Russian.

Animals on different levels of evolution showed varying degrees of adaptation to high altitudes. Under conditions of oxygen deficiency, man exhibited greater deviations from normal values in blood composition, and particularly in red blood count. At 4,200 meter altitude the number of erythrocytes in young adults increased by 4%. A definite shift to the left was noted. The presence of reticulocytes in the peripheral blood indicated an increase in hematopoietic activity.

A64-81291
THE ROLE OF AGE IN THE ORGANISM'S RESPONSE TO HYPOXIA [O ROLI VOZRASTNOGO FAKTORA V REAKTSII ORGANIZMA NA GIPOKSIIU].
N. V. Lauer.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST']. Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 34-41. In Russian.

Investigations showed that in young adults the mechanism of adaptibility to oxygen deficiency in the ambient air was more effective than in immature or elderly persons. At this age the reflexes of respiratory activity, the cardiovascular system, and the blood components are developed to full capacity; the special hypoxia reflexes are well established; and the nervous and humoral systems are in a state of great stability. All these factors enable the organism to maintain a high degree of homeostasis.

A64-81292
MASS GROWTH OF PLANKTON ALGAE DURING SELF PURIFICATION OF SEWAGE IN BIOLOGICAL PONDS [MASSOVOE RAZVITIE PLANKTONNYKH VODOROSLEI PRI SAMOOCHISHCHENII STOCHNYKH VODOROSLEI PRI SAMOOCHISHCHENII STOCHNYKH VOD V BIOLOGICHESKIKH PRUDAKH].
T. N. Sivko and T. A. Sokolova.
Mikrobiologiia, vol. 33, Jul.-Aug. 1964, p. 699-704. 12 refs. In Russian.

A specific character of biological ponds is a mass growth of plankton algae beginning soon after the ponds are filled with undiluted town sewage. Protococcal algae are usually dominant in the ponds with occasional volvoxaceous or euglanaceous. Blue-green and diatomaceous algae are absent in the ponds except some rare occurrences of Navicula. The total algae biomass accumulation does not depend on the species composition of the phytoplankton. The phytoplankton biomass, during periods of its maximum growth, reaches 250 to 300 mgm of ash-free material per liter in the oxidative ponds, which corresponds to 125 to 150 gm/m^2 or to 1250 to 1500 kgm/ha^2 at an average pond depth of 0.5 m. The average rate of algae dry weight increase during the vegetation period (I/V-15/XI) equaled 7.2 gm/m^2 per day (data of 1957 to 1959). The maximum algal biomass increase was equal to 47 mgm/l or 23 gm/m^2 per day.

A64-81293
STUDY OF OXYGENATING ENZYMES (SUCCINO-OXIDASE AND CYTOCHROME OXIDASE) IN THE BRAIN CORTEX AND MEDULLA, IN RATS ADAPTED TO HYPOXIA [ISSLEDOVANIE FERMENTOV OKISLITEL'NOGO OBMENA (SUKTSINOKSIDAZY I TSITOKHROMOKSIDAZY) V KORE BOL'SHIKH POLUSHARII I V PRODOLGOVATOM MOZGU KRYS, AKKLIMATIZIROVANNYKH K GIPOKSII].
E. Iu. Chenykaeva.
IN: OXYGEN DEFICIENCY [KISLORODNAIA NEDOSTATOCHNOST'].

Edited by A. F. Makarchenko.
Kiev, Akademiia Nauk Ukrainskoi SSR, 1963, p. 392-397. In Russian.

Determinations of succino-oxidase and cytochrome oxidase levels in the cardiac muscle, and the brain cortex, and medulla were conducted in the cardiac muscle, the brain cortex, and medulla were conducted in albino rats subjected to hypoxia during several generations. Each new generation showed a tendency toward an increase in anaerobic glycolysis and changes in the cytochrome system, characteristic of a higher tolerance to hypoxia. The hemoglobin content and the number of erythrocytes, as well as the level of carbon-hydrase activity, remained elevated. A combination of these factors led to greater tolerance to hypoxia. However, after the seventeenth generation the hemoglobin content normalized. The hypoxia adapatation mechanism was transferred to the tissue system, that is, the cytochrome system, primarily in the medulla.

A64-81294
SOME FACTORS CONCERNED IN TEMPERATURE REGULATION IN MAN.
L. E. Bayliss, S. E. Dicker, and M. Grace Eggleton (London U. Coll., Depts. of Physiol. and Pharmacol., Gt. Brit.).
Journal of Physiology, vol. 172, Jul. 1964, p. 8P-9P.

Factors involved in a newer technique for studying the relative importance of peripheral and internal body temperature in human thermoregulation are discussed. The technique is based on an apparatus in which the body can be heated (by steam) while the head is cooled. Preliminary results showed large differences in individual response when body heating was started (42° - 46° C.), the head was cooled, and ear temperature was falling. In some cases vasodilatation preceded, rather than followed, a rise in ear temperature. When it preceded the rise, evidently reflex vasodilatation overcame the inhibitory effect of lowered brain temperature.

A64-81295
SIZE CUE TO VISUALLY PERCEIVED DISTANCE.
Walter C. Gogel (Civil Aeromed. Res. Inst., Oklahoma City, Okla.)
Psychological Bulletin, vol. 62, Oct. 1964, p. 217-235. 36 refs.

Evidence indicates that both perceived size S' and retinal size α are involved in both the relative and familiar size cue to relative depth. There is also evidence to indicate that the familiar size cue cannot be subsumed under the relative size cue. But both types of size cues can be included under the concept of perceived size per unit of retinal size (S/α). It is asserted that the perceived depth between objects, as determined by the size cue, is a function of the value of S/α associated with each of the objects. Evidence relevant to specifying the relation between values of S/α and perceived depth is evaluated with respect to methodological problems involved in the use of comparison fields.

A64-81296
THE SIGNIFICANCE OF REFRACTION ABNORMALITIES IN FITNESS RATING [DIE BEDEUTUNG VON REFRAKTIONSFEHLERN BEI DER TAUGLICHKEITSEINSTUFUNG].
G. Hager (Rostock U.-Augenklin, Germany)
Verkehrsmedizin und ihre Grenzgebiete, vol. 11, Jan. 1964, p. 9-14. 8 refs. In German.

Next to anomalies of color and binocular vision, ametropias are a factor to be considered in physical fitness classification for occupational operation of vehicles. Myopia and astigmatism are relatively easy to detect on the basis of lowered visual acuity. Hyperopia in young people is readily suppressed by accommodation and may go unrecognized at the time of initial physical examination. As the accommodative ability decreases with age, manifest hyperopia increases, until at the age of 35 to 40 years corrective glasses become a necessity. Diagnosis of latent hyperopia in younger individuals with apparently normal subjective visual acuity is possible by imposing a + 1.0 sphere in front of the eye before reexamination. If the subject maintains or increases his visual acuity, latent hyperopia is present. The exact degree of hyperopia may be determined later by objective methods (skiascopy or refractometry) after instillation of cycloplegics. These measures may prevent expensive training for an unsuitable occupation as well as rehabilitation problems.

A64-81297
ELECTRICAL ACTIVITY OF NEURONS OF THE VISUAL CORTEX OF THE RABBIT [ELEKTRYCHNA AKTYVNIST' NEIRONIV ZOROVOI KORY KROLYKA].
R. R. Velyka (Ukrainian Acad. of Sci., A. A. Bogomoletz Inst. of Physiol., Kiev).
Fiziologichnyi Zhurnal, vol. 10, Jul.-Aug. 1964, p. 450-459. 15 refs. In Ukrainian.

The effects of photic stimulation of the eye on the electrical potentials of 100 neurons of the visual cortex were studied in rabbits by means of microelectrodes. All neurons investigated were in a state of rhythmic activity in the absence of stimuli. The frequency of discharges amounted to an average of 5 impulses per second, varying in some neurons from zero to 40 impulses. The majority of neurons were characterized by grouped activity. The distribution of intervals between successive impulses had a pronounced left asymmetry. The most common intervals between impulses were 0.22-0.3 sec. Light stimulation of the eyes did not give a distinct reaction in 50% of investigated neurons. In the responding neurons an equal number of primarily excited and primarily inhibited neurons were found. Nine groups of neurons were distinguished that were different in the nature of their reactions. Prolonged continuous stimulation did not perceptibly affect the potentials of cortical neurons and raised the excitability of the cortex only slightly.

A64-81298
EFFECT OF REDUCTION ON THE RELATION BETWEEN APPARENT SIZE AND DISTANCE.
Alan M. Hartman (V. A. Hosp., Roseburg, Ore.)
American Journal of Psychology, vol. 77, Sep. 1964, p. 353-366. 13 refs.

Forty-eight subjects made concurrent judgments of size and distance under three conditions of reduction of cues for monocular viewing. Fifteen subjects made size- and distance-judgments with distance cues eliminated. A second group of 15 subjects made size- and distance-judgments under conditions of contrast or relational cues for size. A third and fourth group, each containing 9 subjects, made size- and distance-judgments under two conditions of enriched, but monocular, viewing. Judgments of distance were equidistant under the severe conditions of reduction of cues to distance, and the corresponding size-matches, which followed the values expected on the basis of visual angles of targets, or at least the function of visual angle, supported the size-distance invariance-hypothesis. Also, as cues to size and distance were added to the visual field, the subjects perceived increases in apparent size and distance as a function of objective distance. The ratios of perceived size to perceived distance were, for the most part, invariant for the conditions of viewing as a whole and as a function of objective distance.

A64-81299
THE DISCRIMINANT-FUNCTION AS A MODEL FOR PERCEPTION.
Albert S. Rodwan and Harold W. Hake (Ill. U., Urbana).
American Journal of Psychology, vol. 77, Sep. 1964, p. 380-392. 12 refs.
Grant No. NSF G-16352.

Fisher's Linear Discriminate Function (LDF) was derived from three assumptions about the nature of perceptual judgments and used as a predictive model in the judgment of multidimensional stimuli. Two experiments involving schematic faces were performed to test the adequacy of the LDF as a model. The LDF's derived from observer's judgments of the "intelligence" of these faces in one condition accurately predicted judgments made under other conditions at other times. Some implications for perception and psychophysics were discussed.

A64-81300
THE BISECTION OF A VISUAL EXTENT.
James Russell Nazzaro (Columbia U., New York, N.Y.)
American Journal of Psychology, vol. 77, Sep. 1964, p. 403-413. 10 refs. ONR supported research.

This study is concerned with the variable error and the absolute error of a subject's performance in bisecting a visual space bounded by two vertical fiducial lines. The results show that increasing the luminance of the field decreases the variability of the settings and also decreases the average absolute error of the settings. Increasing the separation of the fiducial lines increases the variability of the settings and also increases the average absolute error of the bisections. Effects due to luminance changes were analyzed in terms of brightness-discrimination, and Hecht's curve of brightness-discrimination was taken to provide a convenient empirical description, useful for indicating formal similarities among various types of data. Variability of settings was found to be a slightly curvilinear function of fiducial line separation. Changing the area of the visual field seemed to have no effect on the variable error of bisections. Interpretation of the lack of area effect is given in terms of the concept of the restraining properties of borders.

A64-81301
A MODEL FOR DECISION-MAKING UNDER RISK.
S. S. Komorita (Wayne State U., Detroit, Mich.)
American Journal of Psychology, vol. 77, Sep. 1964, p. 429-436. 12 refs.

A model for decision-making in a pay-to-play situation was proposed and tested. Judgments were obtained from 54 graduate students in an imaginary gambling situation, and 8 additional volunteer students in a real gambling situation. For the 54 subjects, grouped data for men

and women were analyzed separately, and for the 8 volunteers, judgments of each individual were analyzed separately. The model yielded an excellent fit of the grouped data, and a relatively good fit was obtained for the data of individual subjects. Although additional tests are indicated, the model appears very promising. A method of measuring a logarithmic interval-scale of utility was also proposed.

A64-81302
INTERMANUAL TRANSFER OF ADAPTATION TO PRISMS.
Charles R. Hamilton (Calif. Inst. of Technol., Pasadena).
American Journal of Psychology, vol. 77, Sep. 1964, p. 457-462.
15 refs.
Grant No. PHS-G-M3372.

The subjects moved one arm back and forth for 15 minutes while viewing the movement through wedge-prisms. Adaptation of eye-hand localization to the lateral deflection of the visual field was not found to transfer to the unpracticed hand as long as movements of head and torso were restricted. Partial transfer occurred when the subjects were permitted movements of head and trunk while adapting.

two vertical fiducial lines. The results show that increasing the luminance of the field decreases the variability of the settings and also de-

A64-81303
MONOCULAR AND BINOCULAR COMPARISON OF APPARENT SIZE.
Robert Fried (Rutgers U., New Brunswick, N.J.)
American Journal of Psychology, vol. 77, Sep. 1964, p. 476-479.

Eight observers compared the apparent length of a line-segment presented binocularly to an identical stimulus presented monocularly. A technique was developed whereby the nature of the comparison was not revealed to the observers. The method of average error was employed and thresholds were obtained for the right and left eye. Results indicate that a monocular stimulus must be made larger than a binocular stimulus at the point where the two are judged to be equal. Unilateral effects were also found and, in conjunction with the thresholds, indicate that the binocular size is not a function of the simple combination of the monocular percepts; nor is it an overlap per se. Statistical significance, at the 5% level, indicates that monocular apparent size is different from binocular apparent size.

A64-81304
AN APPARATUS FOR THE MEASUREMENT OF TACTILE ACUITY.
Dolly Chan (Singapore U., Malaysia).
American Journal of Psychology, vol. 77, Sep. 1964, p. 489-491.

The newly devised apparatus for the measurement of tactile acuity, which is described here, uses a technique based upon the familiar "Landolt C-test" of visual acuity. Testing is limited to the pad of the finger tip, although modification would enable other areas to be tested. The subject is given a series of small metal rings, some complete (O-rings) and some slotted (C-rings), the slots being of 4 widths, 1, 2, 3, and 4 mm. The rings are given to the subject in random order with the C-rings so oriented that the slots point north, south, east, or west. The complete test series consists of 20 rings, 4 of which are O-rings and 4 C-rings of each width of slot. The arrangement of the apparatus effectively masks the test ring from the subject's view. The subject holds the handgrip loosely and this is then adjusted to position his finger over the test ring. The slide is then moved to bring one of the test rings beneath the finger. On the word "down" the subject moves his index finger to touch the ring and immediately reports north, south, east, west, or blank, which is recorded. For each width of slot the number of correct judgments is counted and the percentage of correct responses is calculated to give a measure of reliability of discrimination.

A64-81305
AN APPARATUS FOR MEASURING KINESTHETIC JUDGMENTS.
Edgar Howarth (Alberta U., Canada).
American Journal of Psychology, vol. 77, Sep. 1964, p. 492.

The instrument for measuring kinesthetic judgments described here has as its principal advantage ease of operation. Pictorial representation is presented showing the standard stimulus object, the comparator, and the foot pedal that controls the reversible motor that operates the comparator. This apparatus is presently used for haptical studies of width and the effect of tension and strain upon those judgments, but it may be adapted for studying aftereffects or for other parameters affecting accuracy of width.

A64-81306
THE AUDITORY AUTOKINETIC EFFECT.
D. Chris Anderson (Washburn U., Topeka, Kan.) and Charles A. Moss (Veterans Hosp., East Orange, N.J.)
American Journal of Psychology, vol. 77, Sep. 1964, p. 502-503.

Thirty-six subjects in twelve groups of three subjects each were presented with tones of 1000, 2000, 5000, or 10,000 frequencies in combination with a 20%, 40%, or 60% output of an audio oscillator for six 30-second periods at each frequency level. Each subject indicated the degree of apparent horizontal spatial displacement of the tone on a calibrated rheostat. Auditory autokinetic movement was reported by 28 of the 36 subjects and was not a function of frequency or intensity levels.

A64-81307
24-HOUR PERIODICITY OF MITOTIC DIVISION OF THE CELLS AND OF GLYCOGEN CONTENT IN THE LIVER OF ALBINO RATS [SUTOCHNAIA PERIODICHNOST' MITOTICHESKOGO DELENIIA KLETOK I SODERZHANIIA GLIKOGENA V PECHENI BELYKH KRYS].
L. V. Sokolova (USSR, Acad. of Med. Sci., Inst. of Exptl. Biol. Moscow).
Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 58, Jul. 1964, p. 98-102. 18 refs. In Russian.

Determination was made of mitotic activity and content of glycogen in the liver of albino mice after one hour feeding at 10 a.m. or 10 p.m. that was preceded by 24-hour fasting. Irrespective of the time of rat feeding the maximal mitotic activity was observed at the early morning hours (6 to 8 a.m.), and the minimal one—during the greater part of the 24 hours. With a morning feeding of animals the content of glycogen exhibited a gradual rise and reached the maximum at the period of the minimal mitotic activity. With an evening feeding the highest glycogen content was revealed at the period of the maximal number of mitoses (6 a.m.). Subsequently both the number of mitoses and the glycogen content decreased. Thus, no direct relationship was noted between the glycogen-forming function of the liver and its mitotic activity.

A64-81308
THE EFFECT OF IONIZING RADIATION ON THE 24-HOUR RHYTHM OF MITOTIC ACTIVITY IN THE MOUSE CORNEAL EPITHELIUM [O VLIIANII IONIZIRUIUSHCHEI RADIATSII NA SUTOCHNYI RITM MITOTICHESKOI AKTIVNOSTI V EPITELII ROGOVITSY MYSHI].
V. M. Mastriukova and A. D. Strzhizhovskii.
Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 58, Jul. 1964, p. 106-109. 15 refs. In Russian.

The effect of local and whole-body X-ray irradiation in doses of 200 and 700 r. on the 24-hour mitotic rhythm in the corneal epithelium of mice was studied. The 24-hour variations in mitotic activity ceased soon after loacl irradiation but returned to normal after a period of time. The 200 r. dose of whole-body irradiation did not completely suppress the rhythm. However, after a 700 r. dose there was a progressive decline in the 24-hour mitotic rhythm.

A64-81309
ATTACHMENT TO ELECTROCARDIOGRAPH FOR PULSE RECORDING [PRISTAVKA K ELEKTROKARDIOGRAFU DLIA REGISTRATSII PUL'SA].
V. E. Busygin.
Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 58, Jul. 1964, p. 118-120. In Russian.

An attachment to an ordinary electrocardiograph can be used for recording the volume of the peripheral pulse at various sites of the human limbs. The pick-up is a generator-transducer, which does not require an additional power source. The attachment consists of three parts: (1) a sensor, (2) a manometer, and (3) a valve. It can be also used as a myograph.

A64-81310
MODIFICATION OF THE OPTOKINETIC NYSTAGMUS AFTER LABYRINTHECTOMY [IZMENENIE OPTOKINETICHESKOGO NISTAGMA POSLE LABIRINTEKTOMII].
V. P. Neverov (I. P. Pavlov Inst. of Physiol., Leningrad, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Sep. 1964, p. 1079-1082.
21 refs. In Russian.

After bilateral labyrinthectomy rabbits were placed in the center of a cylinder, of 2 m. diameter, with 22 painted black lines of 5 cm. width. The cylinder was rotated at 2.5 r.p.m. either clockwise or counterclockwise. Eye movements were recorded electro-oculographically. Labyrinthectomy did not change the amplitude of the optokinetic nystagmus; however, its frequency decreased by 20% to 50%. Six months after the labyrinthectomy no normalization was noted.

A64-81311
CIRCULATORY CHANGE IN THE UPPER LIMB UNDER STATIC TENSION [OB IZMENENII KROVOOBRASHCHENIIA V VERKHNEI KONECHNOSTI PRI STATICHESKOM EE NAPRIAZHENII].
R. L. Titievskaia (Med. Inst., Dept. of Physiol., Grodno, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Sep. 1964, p. 1129-1135.
29 refs. In Russian.

Isometric clenching of the hand resulted in a dilatation of the forearm blood vessels, an increase in the volume of the forearm, and a slight increase in pulse rate. The resulting contraction of the forearm muscles under these conditions affected the plethysmogram of the same arm. However, this effect could be distinguished from the vascular response. Static tension caused a depression of local blood circulation, which varied with individuals. After prolonged static tension, upon relaxation, the pulse volume of the forearm increased, producing an increase in the blood supply to this area.

A64-81312
MECHANISM OF DIURNAL VARIATIONS OF CONTINUOUS GASTRIC SECRETION IN MONKEYS [O MEKHANIZME SUTOCHNYKH KOLEBANII NEPRERYVNOI ZHELUDOCHNOI SEKRETSII U OBEZ'IAN].
V. G. Startsev (Inst. of Exptl. Pathol. and Therapy, Lab. for Physiol. and Pathol. of Higher Nervous Activity, Sukhumi, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Sep. 1964, p. 1169-1176. 10 refs. In Russian.

Diurnal variations of gastric secretion were studied in a group of adult baboons, Papio hamadryas, with fistulas at the fundus and the pyloric portion of the stomach. The animals were fed on a regular schedule four times daily and were exposed to normal ambient conditions. At night the light was turned off. Fasting samples contained pure gastric juice with small amounts of mucus. From 8:00 a.m. to 4:00 p.m., that is, during the normal daylight period, hydrochloric acid, enzymes, and bile salts were produced in normal amounts. With the onset of darkness the secretion of these substances was completely depressed. Brief nocturnal illumination stimulated secretion to some extent. The total volume of gastric juice and pepsin did not vary during the 24-hour period.

A64-81313
EIGHTH SYMPOSIUM ON PHYSIOLOGY AND BIOCHEMISTRY OF MUSCLE ACTIVITY [VIII KONFERENTSIIA PO FIZIOLOGII I BIOKHIMII MYSHECHNOI DEIATEL'NOSTI].
N. V. Zimkin .
Fiziologicheskii Zhurnal SSSR, vol. 50, Sep. 1964, p. 1196-1198. In Russian.

The Eighth Congress of Physiology and Biochemistry, held in Volgograd, USSR, was devoted to the following topics: (1) Nervous regulation of physiological functions. (2) Mechanism of coordination of motion. (3) Changes in parameters of motion and physiological functions during repeated muscular activity. (4) Effect of training on strength and endurance. (5) Relationship between muscular activity rhythm and metabolism and regeneration of tissues. (6) Cardiovascular function during muscular activity. (7) Respiration and gas exchange during muscular action. (8) Relationship between muscular activity and the endocrine system. (9) Role of fatigue. (10) Relationship between age and training in the growing organism.

A64-81314
AUTOCORRELATION AND CROSSCORRELATION ANALYSIS OF "LABELLED WORK RHYTHMS" IN THE HUMAN EEG DURING MUSCLE WORK [AVTOKORRELIATSIONNYI I KROSSKORRELIATSIONNYI ANALIZ "MECHENYKH RITMOV" V EEG CHELOVEKA PRI MYSHECHNOI DEIATEL'NOSTI].
E. B. Sologub (P. F. Lesgaft Inst. of Phys. Culture, Dept. of Physiol., Leningrad, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Jun. 1964, p. 681-689. 14 refs. In Russian.

Autocorrelation and crosscorrelation analysis of the slow waves in the brain potentials of the motor activity rhythm, or the "marked rhythm" of athletes during a 30-minute run on a treadmill disclosed the following variations: (1) The "marked rhythm" was more pronounced in individuals with moderate training. (2) The alpha-rhythm predominated in highly trained athletes. (3) The "marked rhythm" was more pronounced in the right hemisphere of the individuals in the early stages of training, and in the left hemisphere in the accomplished runners. (4) There was a definite relationship between the "marked rhythm" and the functional state of the brain: aminasin decreased and caffeine increased the expression, regularity, and irradiation of the rhythm. (5) The application of crosscorrelating analysis permitted a study of the type of rhythm phases in various areas of the brain in the course of muscular activity.

A64-81315
ELECTROMYOGRAPHIC CHARACTERISTICS OF MUSCLE WORK WITH DIFFERENT LOADS AND RATES OF MOVEMENT IN HUMANS [ELEKTROMIOGRAFICHESKAIA KHARAKTERISTIKA RABOTY MYSHTS PRI RAZNYKH NAGRUZKAKH I SKOROSTIAKH DVIZHENII CHELOVEKA].
Iu. Z. Zakhar'iants (P. F. Lesgaft Inst. of Phys. Culture, Dept. of Physiol., Leningrad, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Jun. 1964, p. 716-726. 14 refs. In Russian.

Electromyographic characteristics of muscle activity during flexing and extending of elbow and wrist joints, as different loads and rates of movement in humans, disclosed the following facts: (1) Simultaneous increase in rate and load led to an increase in the amplitude of potentials until it reached a certain limit. (2) The relationship between the muscle antagonists during various phases of circular movements was characterized by immediate as well as delayed stimulation. Notwithstanding the constant coordinating relationship, the increase in rate of movement and load led to changes in the distribution of workload between the antagonists. (3) Large loads and fast rates of movement led to a decrease in the amplitude of movement, regardless of the mobilization and synchronization of the activity of the neuromotor units. As a result, the posture was changed and readjustment in muscular activity took place, which facilitated the maintenance of high rates at large loads.

A64-81316
ASYMMETRY IN MANIFESTATIONS OF MUSCLE SENSE [ASIMMETRIIA V PROIAVLENII MYSHECHNOGO CHUVSTVA].
E. P. Il'in (A. A. Ukhtomski Physiol. Inst., Lab. for Work Physiol., Leningrad, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 50, Jun. 1964, p. 736-740. In Russian.

In the majority of subjects, muscle sense in the judgment of weight load is developed to the same extent in both arms. Occasionally an individual exhibits a different muscle sense of weight in each arm, which can be explained by conditioned experience. This may be due to the fact that each arm has an optimum load-sense, at which judgment is most accurate. At optimum-load excess, the right arm performs better than the left one. Below optimum-load, the left arm gives a better performance. This is due to the asymmetry of the brain centers. Experiments on human subjects showed that the dominant role of the left hemispheric centers was preserved under different experimental conditions. In all series of experiments, the weight guessed was underestimated when the load was placed on a finger of the right hand. The results were opposite when the left hand was tested.

A64-81317
STUDIES ON AIRCRAFT DISINSECTIZATION AT "BLOCKS AWAY" IN TROPICAL AREAS.
W. N. Sullivan, J. W. Wright, N. G. Gratz (World Health Org., Div. of Environ. Health, Geneva, Switzerland), and J. C. Azurin (Dept. of Health, Manila, Philippines).
Bulletin of the World Health Organization, vol. 30, 1964, p. 113-118.

During 1962, experiments on disinsectization of aircraft passenger cabins at "blocks away" (i.e., after the doors have been closed following embarkation but before takeoff) were conducted with single-use, disposable aerosol dispensers in various types of commercial aircraft operating in the tropics. The favorable results of these trials and of previous trials in temperate zones indicate that this method is suitable as a standard procedure for aircraft disinsectization for international quarantine purposes. The biological effectiveness of the World Health Organization Standard Reference Aerosol (SRA) formulation against susceptible mosquitoes and its nonirritancy to passengers render it suitable as a standard formulation for aircraft disinsectization. The G-1492 formulation– effective against resistant and nonresistant mosquitoes – could be used where insecticide-resistance is proved, although it is a slight irritant to some passengers. Both formulations are described. The authors suggest that further research is needed to develop a safe formulation that is effective against resistant and nonresistant insects and yet not an irritant to passengers and crew.

A64-81318
URINARY CASTS IN EXERCISE.
R. Patel (Otago U., Dept. of Pharmacol. and Wellcome Inst. of Med. Res., Dunedin, New Zealand).
Australasian Annals of Medicine, vol. 13, 1964, p. 170-173. 16 refs.

Exercises of 30 min. duration and of sufficient severity to produce exhaustion resulted in the formation of large numbers of casts in the urine of eight healthy male volunteers. The coexistence of high concentration of TH mucoprotein with large numbers of casts in the urine passed after exercise suggests that casts are formed from the mucoprotein when it becomes sufficiently concentrated in the renal tubules. It has been shown in In vitro experiments with glass capillary tubes that deposition of TH mucoprotein is closely related to concentration. It is suggested that similar factors may be concerned in cast formation in acute renal failure.

A64-81319
INFLUENCE OF WATER TEMPERATURE ON HEART RATE AND RECTAL TEMPERATURE OF SWIMMING RATS.
Mary Ann Baker and Steven M. Horvath (Calif. U., Environ. Stress Lab., Santa Barbara).
American Journal of Physiology, vol. 207, Nov. 1964, p. 1073-1076. 12 refs. U. of Calif. supported research.
Grant No. NIH-G-HE-07008-02.

The heart rate and rectal temperature of 12 adult male hooded rats were studied during 10-minute swims in water of 37°, 20°, and 42° C. Both the heart rate and the rectal temperature stabilized in water of 37°C, suggesting that swimming in thermoneutral water is a submaximal exercise for rats. In water of 20° C, rectal temperature and heart rate of swimming animals fell exponentially to 28° C and 251 beats/minute respectively. The relationship of heart rate to rectal temperature in these swimming, cooling animals was not different from that reported in the literature for unanesthetized, inactive hypothermic rats. It appeared that exercise had no effect on the heart rate of rats when the body temperature was dropping. In water of 42° C the rectal temperature rose exponentially to 42.2° C. The heart rate rose to 521 beats/minute at the 8th minute of swimming and remained stable thereafter. It is suggested that inadequate cardiac output resulting from severe changes in body temperature may be one factor that limits swimming capacity of small animals in hot and cold water.

A64-81320
ENDOGENOUS CIRCADIAN RHYTHM IN CYTOPLASMA OF ACETABULARIA: INFLUENCE OF THE NUCLEUS.
E. Schweiger, H. G. Wallraff, and H. G. Schweiger (Max-Planck Inst. fur Meeresbiol. and Verhaltensphysiol., Wilhelmshaven, Germany).
Science, vol. 146, Oct. 30, 1964, p. 658-659. 6 refs. Deutsche Forsuchungsgemeinschaft supported research.

A circadian rhythm of oxygen balance was demonstrated in the green alga, Acetabularia. The nucleus was combined with cytoplasm in different phases to determine which of these two components governs the rhythm under various conditions of illumination. The treatment of the plants and the varied experimental conditions to achieve three types of experiments are described. Results showed that the nucleus is capable of determining the phase of the diurnal rhythm of oxygen balance. It is suggested that this is the first clear demonstration of the participation of the nucleus in the mechanism of a circadian rhythm. It appears that this regulation depends on the exchange of material between the nucleus and the cytoplasm.

A64-81321
EXERCISE TRAINING AND ALTITUDE TOLERANCE IN RATS: BLOOD TISSUE, ENZYME AND ISOENZYME CHANGES.
Paul D. Altland, Benjamin Highman, and Joel Garbus (NIH, Natl. Inst. of Arthritis and Metab. Diseases, Bethesda, Md.)
Aerospace Medicine, vol. 35, Nov. 1964, p. 1034-1039. 17 refs.

Prior ground level exercise training of rats 7 to 19 days, but not 3 days, improved exercise tolerance of 28,000 feet, but not tolerance of resting rats at 32,000 feet. During training, transient reductions in weight and hematocrit, leukocytosis, alterations in serum enzyme levels, and fatty changes and necrosis of muscle occurred. Diurnal changes in lymphocytes and neutrophils persisted throughout training. Exposure to 28,000 feet (exercise) and 32,000 feet (rest) induced fatty changes in heart, liver, kidney, and muscles and altered values in serum glutamic oxalacetic and pyruvic transaminases, lactic dehydrogenase, aldolase, alkaline phosphatase, and urea nitrogen. Normal serum lactic dehydrogenase isoenzyme bands 1, 2, and 5 were accentuated at high altitude, and bands 3 and 4 appeared in untrained rats exercising at 28,000 feet. Prior exercise training lessened liver glycogen depletion, but had no significant effect on fatty changes and other lesions attributable to altitude hypoxia. Such training, however, diminished some serum enzyme and isoenzyme changes at 28,000 and 32,000 feet and improved tolerance to moderate but not to extreme altitude.

A64-81322
A COMPARISON OF METHODS FOR THE EVALUATION OF PROTECTIVE HEADGEAR.
J. B. Roberts and E. H. Hygh (Naval Ordnance Lab., Corona, Calif. and Utah Univ., Physics Dept., Salt Lake City).
Aerospace Medicine, vol. 35, Nov. 1964, p. 1044-1047. 7 refs.

Two principal methods of headgear testing (Snell "swingaway" type testing and helmet impact tester rigid anvil type testing system) are investigated and the relative merits of each are discussed. On a swingaway test in which the input energy is 120 foot-pounds, the energy available for conversion to heat on the first blow is about 60 foot-pounds and the helmet quite likely will stand another blow of the same magnitude. On the other hand, if the same input energy is used on a helmet impact tester rigid anvil system, over 100 foot-pounds are converted to heat on the first blow and there is absolutely no chance for a nonresilient helmet liner to withstand a second blow. It is concluded that the latter test system, or a variation of the same, is the scheme most compatible with the problem of performing experiments necessary for analyzing the shock spectrum or those studies necessary for observing the effects of cavitation.

A64-81323
COMMUNICATION AND SOUND TRANSMISSION IN HELIUM AND VARIOUS GASES AT REDUCED PRESSURES.
Julian P. Cooke (USAF School of Aerospace Med., Brooks AFB, Tex.)
Aerospace Medicine, vol. 35, Nov. 1964, p. 1050-1053. 16 refs.

This study was devised in two parts-- (a) as a pilot study with human subjects to help evaluate the feasibility of oral communications in a 50-50 helium-oxygen environment at 395 mm. Hg absolute pressure; and (b) to investigate sound attenuation in helium, other gases, and gas mixtures at reduced barometric pressures. The study has shown that tonal modification in the helium-oxygen atmosphere does not result in unintelligible oral communication. It appears that the amount of attenuation found in the helium-oxygen mixture will not present any severe communication problems. The many properties of helium that are quite different from nitrogen may cause physiological changes in living organisms, and such possible differences must be investigated prior to the recommendation that a helium-oxygen mixture be substituted for the nitrogen-oxygen atmosphere of space vehicles.

A64-81324
HUMAN PERFORMANCE DURING TWO WEEKS IN A ROOM ROTATING AT THREE RPM.
Fred E. Guedry, Jr., Robert S. Kennedy, Charles S. Harris, and Ashton Graybiel (U.S. Naval School of Aviation Med., Pensacola, Fla.)
Aerospace Medicine, vol. 35, Nov. 1964, p. 1071-1082. 30 refs.

Four men were tested before, during, and after being rotated at 3.0 rpm for two weeks in the Pensacola Slow Rotation Room. The men also lived in the room preceding the commencement of the rotation. Tests of intellectual and physiological functions were included. The principal finding was that no serious psychological or physiological deficit was detected during two weeks of rotation of during the subsequent readaptation to normal environment. The only test showing pronounced deterioration of performance at the beginning of rotation and upon returning to normal environment was the Graybiel-Fregly Posture Test. This means that any task requiring ordinarily difficult locomotion would be disturbed at these critical intervals. Ordinary walking with adequate visual reference was not so obviously affected. Results are discussed in relation to: problems of rotating space stations, the vestibular system, and experiments involving optically distorted visual information.

A64-81325
HUMAN SPATIAL ORIENTATION AND ITS CRITICAL ROLE IN SPACE TRAVEL.
Leonard A. Cohen (Albert Einstein Med. Center, Dept. of Physiol., Philadelphia, Pa.)
Aerospace Medicine, vol. 35, Nov. 1964, p. 1054-1057. 11 refs.
Grant No. NIMH-G-MY-5823.

Specific orientation components and mechanisms in the human body are discussed as they relate to total body orientation during space travel. The following are included: (1) eye mechanisms (retina, ciliary muscle, and extraocular muscle), (2) vestibular apparatus, (3) neck proprioceptors, (4) pressure-gravity activated body receptors, (5) visceral proprioceptors, and (6) receptors mainly of local significance (muscle, tendon, and joint receptors). If some of these structures are receiving normal stimulation, the subject can derive fairly good body orientation; but if, on the other hand, many of these or even all of these are receiving stimuli that are not normal on earth, and it is happening simultaneously, then a new order of disorientation can be assumed because there are no normal cues coming that are meaningful in terms of terrestrial experiences. The use of hallucinogenic drugs as a means of producing true spatial disorientation may prove to be a useful technique. Three hallucinogens have been shown to have this effect, and they might be helpful, for example, in familiarizing astronauts with performance of required tasks under conditions of disorientation. Furthermore, the effectiveness of training to overcome this disorientation can be investigated, which could be a useful technique to improve performance under actual conditions.

A64-81326
WHICH EYE DISEASES CAUSE PERMANENT INCAPACITY TO DRIVE VEHICLES IN THE DIFFERENT BRANCHES OF TRAFFIC [WELCHE AUGENKRANKHEITEN MACHEN STANDIG UNTAUGLICH FUR DEN FAHRDIENST IN DEN VERSCHIEDENEN VERKEHRSZWEIGEN?]
M. Kindel (Rostock U.-Augenklin., Germany).

Verkehrsmedizin und ihre Grenzgebiete, vol. 11, May 1964, p. 221-232. 23 refs. In German.

Occupational demands on vision are discussed for streetcar operators, truck drivers, merchant marine personnel, railroad workers, flight personnel, etc. A distinction is made between the requirements at the initial pre-employment physical examination and subsequent periodic checks. Certain eye diseases (trachoma, progressive retinal diseases, atrophy of the optic nerve, iritis, etc.) are considered grounds for transfer to a less visually demanding job. Glaucoma disqualifies a pilot since it may become acute under flight stresses and cause the loss of control over the aircraft. Less serious chronic eye diseases may also prove to be too stressful for occupational flying. The second part of the article gives a list of eye diseases which disqualify personnel for service in the merchant marine.

A64-81327

ACTION OF FREE FATTY ACIDS AND BLOOD SUGAR IN ATHLETES AFTER GRADED PHYSICAL STRESS ON BICYCLE ERGOMETER [ZUM VERHALTEN DER FREIEN FETTSAUREN UND DES BLUTZUCKERS BEI SPORTTREIBENDEN NACH DOSIERTER FAHRRADERGOMETERBELASTUNG].

H. Wuschech, W. Kohler, W. Friedel, and W. Schneider (Med. U., Klin. der Charite, Berlin, Germany).

Das Deutsche Gesundheitswesen, vol. 19, Sep. 3, 1964, p. 1168-1670. 11 refs. In German.

Oxymetric and Hagedorn-Jensen methods were used to evaluate blood sugar levels and free fatty acids in 29 athletes before and after exercise on a bicycle ergometer. It is hypothesized that during and after exercise free fatty acids and blood sugar levels will increase above the initial values. Blood sugar levels and free fatty acids were found increased after physical stress in 21 athletes in good training condition, i.e., trained according to the interval method. Deviating values were obtained in 8 athletes in poor training condition (training interrupted for various reasons).

A64-81328

SIZE-CONSTANCY AND CRITICAL FLICKER-FREQUENCY.

Irwin M. Spigel (Temple U., Philadelphia, Pa.)

American Journal of Psychology, vol. 77, Sep. 1964, p. 469-471.

An experiment was performed to see whether a size-constancy effect would offset an expected decrement in the critical flicker fusion frequency (CFF) normally following a reduction of the retinal size of stimulus. CFFs were obtained from 18 observers under three size conditions. The stimuli under the two latter arrangements subtended the same visual angle. Brightness was held constant. The results reflected the effects of constancy, with the CFFs obtained with the 1 in. light-source at 80 in. significantly closer to those obtained with the 1 in. stimulus at 40 in. rather than to the thresholds obtained under the 1/2 in. diameter at 80 in. which subtended the same visual angle. In short, the expected decrement in the CFF with reduced retinal size was considerably offset by what appeared to be the influence of size-constancy in the experimental situation.

A64-81329

USES OF THE CENTRIFUGE IN STUDIES OF THE ORIENTATION OF SPACE.

Herman A. Witkin (N.Y. State U., Downstate Med. Center, New York).

American Journal of Psychology, vol. 77, Sep. 1964, p. 499-502. 6 refs.

Human performance was examined within a rotating room in tilting-room-tilting-chair and rod-and-frame tests. With few exceptions the subjects became aware of being rotated during the initial acceleration. The results were in accordance with the following hypothesis. Self-consistency in performance across the tilting-room-tilting-chair and rod-and-frame tests is a function of a characteristic tendency to adhere or not to adhere to the surrounding visual field. Thus, the individuals who align the body and rod with tilted room and frame in these situations would also align the body with the room, now objectively upright, in the rotating-room tests. Whereas their determinations would be far off the upright in the first two situations (highly inaccurate), they would be close to the true upright (highly accurate) in the third.

A64-81330

TERRAIN EFFECTS UPON PERCEIVED DISTANCE.

John A. Mc Nulty (Dalhousie U., Halifax, Nova Scotia, Canada) and Robert St. Claire-Smith (British Columbia U., Vancouver, Canada).

Canadian Journal of Psychology, vol. 18, Sep. 1964, p. 175-182. 9 refs.

Terrain in the form of two green ribbons was placed at different positions in front of a homogeneous, featureless surface. Subjects estimated the distance to various background locations in the presence and absence of the terrain. Even though all the estimated locations were equidistant from the observer, results showed that the perceived distance to a surface location was inversely proportional to the angle of the viewing plane with terrain.

A64-81331

SECOND SYMPOSIUM ON BIOTELEMETRY, HELD IN SVERDLOVSK [VTOROI SIMPOZIUM PO BIOTELEMETRII V SVERDLOVSKE].

V. V. Parin and V. V. Rozenblat.

Fiziologicheskii Zhurnal SSSR, vol. 50, Sep. 1964, p. 1191-1193. In Russian.

During the second Soviet symposium of biotelemetry, which took place in Sverdlovsk, USSR, the following topics were discussed: (1) classification system of biotelemetry methods; (2) appraisal of existing method; (3) planning of radiotelemetry centers; (4) presentation of telemetric data in the field of physiology; and (5) construction of telemetric apparatus. Telemetric exhibits were presented. Coordination of work in all fields where telemetry could be used was recommended.

A64-81332

INFLUENCE OF EXERCISE ON BLOOD SERUM PROTEIN FRACTIONS IN ELDERLY PERSONS [VLIIANIE FIZICHESKIKH UPRAZHNENII NA BELKOVYE FRANKTSII SYVOROTKI KROVI U LITS STARSHEO VOZRASTA].

A. F. Krasnova (Res. Inst. of Phys. Culture, Dept. of Biochem., Leningrad, USSR).

Fiziologicheskii Zhurnal SSSR, vol. 50, Jun. 1964, p. 756-761. 24 refs. In Russian.

With age, the protein fraction ratio of human blood serum undergoes a change — the albumin fraction decreases, while the beta- and gamma-globulin fraction increase. A study of a group of persons between the ages of 50 and 63 who participated in a program of regular physical exercise and sports, such as skiing and rowing, for a period of one to four years, disclosed the following facts: (1) Regular physical exercise leads to normalization of the blood-serum protein content. (2) The blood-serum protein-fraction changes whenever an exercise depended on the duration and strenuousness of the exercise. (3) The changes in the protein fractions could serve as indices of adaptation of the aged organism to muscular activity during exercise. (4) In older persons the adaptation to muscular activity is weaker than in younger adults.

A64-81333

SYMPOSIUM ON RELATIONSHIPS BETWEEN MOTOR AND VEGETATIVE FUNCTIONS IN THE PROCESS OF PHYSICAL TRAINING [SIMPOZIUM "O VZAIMOSVIAZI DVIGATEL 'NYKHI VEGETATIVNYKH FUNKTSII V PROTSESSE FIZICHESKOI TRENIROVKI"].

N. V. Zimkin.

Fiziologicheskii Zhurnal SSSR, vol.50, Jun. 1964, p. 769-771. In Russian.

During a symposium on the effects of motor activity on the functions of the organism and on metabolism in the process of physical training, held at Leningrad in October 1963, several facts were presented: (1) During muscular activity, the interoreceptors affect the skeletal muscles to a lesser degree than the proprioceptors affect the functional state of the organism. (2) Motor activity enhances the resistance of the organism to unfavorable ambient conditions. (3) Muscular action stimulates the function of the organism resulting in an increase of protein metabolism of the brain centers with a simultaneous increase in formation of ammonia, and in lipid and glycogen metabolism. (4) During physical exercise, specific aids, such as oxygen inhalation, vitamin intake, and special diet are indicated during competitions but should be avoided during the training period. (5) Well programmed physical training led to stable changes in functions of the organisms that allowed strenuous physical exertions without any ill effects.

A64-81334

PROBLEMS IN AIR TRAFFIC MANAGEMENT. V. IDENTIFICATION AND POTENTIAL OF APTITUDE TEST MEASURES FOR SELECTION OF TOWER AIR TRAFFIC CONTROLLER TRAINEES.

Bart B. Cobb (FAA, Civil Aeromed. Res. Inst., Aeron. Center, Oklahoma City, Okla.)

Aerospace Medicine, vol. 35, Nov. 1964, p. 1091-1027. 7 refs.

A study of over 200 Terminal Air Traffic Control Specialists (ATCS) indicated that their training performance could be well predicted by a composite of four aptitude tests measuring: numerical ability, nonverbal abstract reasoning, ability to solve simplified air traffic problems, and verbal abstract reasoning. Pre-employment experience directly related to air traffic control was also found to contribute to the prediction of training performance. Although the aptitude tests were related in the expected direction with a measure of job performance, the relationships were small. The aptitude of the verbal abstract reasoning is both unique and important for the prediction of Terminal ATCS performance. Previous research has failed to identify such an aptitude as being of importance for the prediction of enroute

ATCS performance. With the exception of verbal abstract reasoning, the group of Civil Service Commission tests presently being used to select all ATCS trainees provides adequate measures of those aptitudes which this study identified as most significant for the prediction of Terminal performance and is still appropriate for selection of Terminal ATCS trainees.

A64-81335
U.S. NAVY AIRCRAFT WEAPON SYSTEMS ANTHROPOMETRY.
Walton L. Jones and Edmund C. Gifford (Dept. of the Navy, Bur. of Med. and Surg., Washington, D.C.; and Naval Air Eng. Center, Aerospace Crew Equipment Lab., Philadelphia, Pa.)
Aerospace Medicine, vol. 35, Nov. 1964, p. 1048-1050.

The results of this study enable the Navy flight surgeon to evaluate clinically, each potential aviator with respect to his accommodation in naval aircraft. Knowing the dimensions of the Navy aircraft cockpit inventory, and with the Integrated Anthropometric Device as a tool, the flight surgeon can make a reliable evaluation. The necessity for aircraft cockpit designs to accommodate as much of the pilot population as possible, but at least the 5-95 percentiles, is emphasized. When the dimensions of the cockpits deviate to any degree from fulfilling this requirement, the aircrew population of the particular aircraft will of necessity be limited or will be hampered in the performance of their missions. Of equal importance is the compromise in safety and survival.

A64-81336
PRINCIPLES AND METHODS OF APPLICATION OF ELECTROENCEPHALOGRAPHY IN AVIATION MEDICINE.
C. Blanc, E. Lafontaine, and R. Laplane (Compagnie Nationale Air France, Central Med. Dept., Paris, France).
Aerospace Medicine, vol. 35, Nov. 1964, p. 1083-1088. 10 refs.

Ten thousand electroencephalograms (EEG), arranged in evolutive studies, were made in Air France laboratories these last ten years (8000 tracings in the Cabin Staff group, 950 in the pilot group, 1050 in the ground staff group). The subclinical EEG disturbances frequently observed in this population (35% in the Cabin Staff group, 20% in the pilot group) appear to be correlated with psychological, psychiatric, or psychophysiological factors in a great many longitudinal observations. They do not seem to be linked to potential epilepsies as had been initially supposed. In aeronautical medium, electroencephalography must be considered as a satellite technique of the psychological and neuropsychiatric selection.

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